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WORKFORCE REQUIREMENTS OF MAJOR ALBERTA RESOURCE PROJECTS 1990 - 1999

RECENTLY CONSTRUCTED, UNDER CONSTRUCTION OR PROPOSED

August 1990

Alberta

CAREER DEVELOPMENT
AND EMPLOYMENT

Labour Market
Research Division

PR002

TABLE OF CONTENTS

Page

PART 1: OVERVIEW

Highlights 1

FIGURE 1.0 Actual and Projected Timing of New Major Resource Projects in Alberta, 1990-1999 2

TABLE 1.0 A Comparison of the Projected Construction Workforce Requirements by Resource Sector in Alberta, 1990-1999 3

TABLE 1.1 A Comparison of the Projected Operational Workforce Requirements by Resource Sector in Alberta, 1990-1999 3

FIGURE 1.1 A Comparison of the Projected Construction Workforce Requirements by Resource Sector in Alberta, 1990-1999 4

FIGURE 1.2 A Comparison of the Projected Operational Workforce Requirements by Resource Sector In Alberta, 1990-1999 5

TABLE 1.2 A Comparison of Projected Construction Workforce Requirements By Year for New Major Resource Projects in Alberta, 1990-1999 6

TABLE 1.3 A Comparison of Projected Operational Workforce Requirements By Year for New Major Resource Projects in Alberta, 1990-1999 6

FIGURE 1.3 A Comparison of Projected Construction Workforce Requirements By Year for New Major Resource Projects in Alberta, 1990-1999 7

FIGURE 1.4 A Comparison of Projected Operational Workforce Requirements By Year for New Major Resource Projects in Alberta, 1990-1999 8

FIGURE 1.5 A Comparison of Construction and Operational Workforce Requirements for Selected Major Resource Projects 9

TABLE 1.4 A Summary of Projected Workforce Requirements of New Major Resource Projects in Alberta, 1990-1999 10

TABLE 1.5 Type of Production of New Major Resource Projects in Alberta, 1990-1999 11

TABLE 1.6 A Summary of Trade and Occupational Descriptions and Workforce Requirements Related to the Construction and Operation of New Major Resource Projects in Alberta 12

PART 2: OIL PROJECTS

FIGURE 2.0 Actual and Projected Timing of New Major Oil Projects in Alberta, 1990-1999 21

TABLE 2.0 Projected Construction and Operational Workforce Requirements for New Major Oil Projects in Alberta, 1990-1999 22

TABLE 2.1 Projected Construction Workforce Requirements for Specific Oil Projects in Alberta 23

TABLE 2.2 Projected Operational Workforce Requirements for Specific Oil Projects in Alberta 23

TABLE 2.3 Projected Construction Workforce Requirements by Year for New Major Oil Projects in Alberta, 1990-1999 24

TABLE 2.4 Projected Operational Workforce Requirements by Year for New Major Oil Projects in Alberta, 1990-1999 24

FIGURE 2.1 Location of Major Oil Projects in Alberta 25

PART 3: GAS PROJECTS

FIGURE 3.0 Actual and Projected Timing of New Major Gas Projects in Alberta, 1990-1999 26

TABLE 3.0 Projected Construction and Operational Workforce Requirements for New Major Gas Projects in Alberta, 1990-1999 27

TABLE 3.1 Projected Construction Workforce Requirements for Specific Gas Projects in Alberta 28

TABLE 3.2 Projected Operational Workforce Requirements for Specific Gas Projects in Alberta 28

TABLE 3.3 Projected Construction Workforce Requirements by Year for New Major Gas Projects in Alberta, 1990-1999 29

TABLE 3.4 Projected Operational Workforce Requirements by Year for New Major Gas Projects in Alberta, 1990-1999 29

FIGURE 3.1 Location of Major Gas Projects in Alberta 30

PART 4: PETROCHEMICAL PROJECTS

FIGURE 4.0 Actual and Projected Timing of New Major Petrochemical Projects in Alberta, 1990-1999 31

TABLE 4.0 Projected Construction and Operational Workforce Requirements for New Major Petrochemical Projects in Alberta, 1990-1999 32

TABLE 4.1 Projected Construction Workforce Requirements for Specific Petrochemical Projects in Alberta, 1990-1999 33

TABLE 4.2 Projected Operational Workforce Requirements for Specific Petrochemical Projects in Alberta, 1990-1999 33

TABLE 4.3 Projected Construction Workforce Requirements by Year for New Major Petrochemical Projects in Alberta, 1990-1999 34

TABLE 4.4 Projected Operational Workforce Requirements by Year for New Major Petrochemical Projects in Alberta, 1990-1999 34

FIGURE 4.1 Location of Major Petrochemical Projects in Alberta 35

PART 5: MINING PROJECTS

FIGURE 5.0 Actual and Projected Timing of New Major Mining Projects in Alberta, 1990-1999 36

TABLE 5.0 Projected Construction and Operational Workforce Requirements for New Major Mining Projects in Alberta, 1990-1999 37

TABLE 5.1 Projected Construction Workforce Requirements for Specific Mining Projects in Alberta 38

TABLE 5.2 Projected Operational Workforce Requirements for Specific Mining Projects in Alberta 38

TABLE 5.3 Projected Construction Workforce Requirements by Year for New Major Mining Projects in Alberta, 1990-1999 39

TABLE 5.4 Projected Operational Workforce Requirements by Year for New Major Mining Projects in Alberta, 1990-1999 39

FIGURE 5.1 Location of Major Mining Projects in Alberta 40

PART 6: FORESTRY PROJECTS

FIGURE 6.0 Actual and Projected Timing of New Major Forestry Projects in Alberta, 1990-1999 41

TABLE 6.0 Projected Construction and Operational Workforce Requirements for New Major Forestry Projects in Alberta, 1990-1999 42

TABLE 6.1 Projected Construction Workforce Requirements for Specific Forestry Projects in Alberta 43

TABLE 6.2 Projected Operational Workforce Requirements for Specific Forestry Projects in Alberta 43

TABLE 6.3 Projected Construction Workforce Requirements by Year for New Major Forestry Projects in Alberta, 1990-1999 44

TABLE 6.4 Projected Operational Workforce Requirements by Year for New Major Forestry Projects in Alberta, 1990-1999 44

FIGURE 6.1 Location of Major Forestry Projects in Alberta 45

PART 7: PIPELINE PROJECTS

FIGURE 7.0 Actual and Projected Timing of New Major Pipeline Projects in Alberta, 1990-1999 46

TABLE 7.0 Projected Construction and Operational Workforce Requirements for New Major Pipeline Projects in Alberta, 1990-1999 47

TABLE 7.1 Projected Construction Workforce Requirements for Specific Pipeline Projects in Alberta 48

TABLE 7.2 Projected Operational Workforce Requirements for Specific Pipeline Projects in Alberta 48

TABLE 7.3 Projected Construction Workforce Requirements by Year for New Major Pipeline Projects in Alberta, 1990-1999 49

TABLE 7.4 Projected Operational Workforce Requirements by Year for New Major Pipeline Projects in Alberta, 1990-1999 49

PART 8: ELECTRIC UTILITY/DAM PROJECTS

FIGURE 8.0 Actual and Projected Timing of New Major Electric Utility/Dam Projects in Alberta, 1990-1999 50

TABLE 8.0 Projected Construction and Operational Workforce Requirements for New Major Electric Utility/Dam Projects in Alberta, 1990-1999 51

TABLE 8.1 Projected Construction Workforce Requirements for Specific Electric Utility/Dam Projects in Alberta 52

TABLE 8.2 Projected Operational Workforce Requirements for Specific Electric Utility/Dam Projects in Alberta.....52

TABLE 8.3 Projected Construction Workforce Requirements by Year for New Major Electric Utility/Dam Projects in Alberta, 1990-1999.....53

TABLE 8.4 Projected Operational Workforce Requirements by Year for New Major Electric Utility/Dam Projects in Alberta, 1990-1999.....53

FIGURE 8.1 Location of Major Electric Utility/Dam Projects in Alberta.....54

PART 9: AGRICULTURAL PROJECTS

FIGURE 9.0 Actual and Projected Timing of New Major Agricultural Projects in Alberta, 1990-1999.....55

TABLE 9.0 Projected Construction and Operational Workforce Requirements for New Major Agricultural Projects in Alberta, 1990-1999.....55

TABLE 9.1 Projected Construction Workforce Requirements for Specific Agricultural Projects in Alberta.....56

TABLE 9.2 Projected Operational Workforce Requirements for Specific Agricultural Projects in Alberta.....56

TABLE 9.3 Projected Construction Workforce Requirements by Year for New Major Agricultural Projects in Alberta, 1990-1999.....57

TABLE 9.4 Projected Operational Workforce Requirements by Year for New Major Agricultural Projects in Alberta, 1990-1999.....57

FIGURE 9.1 Location of Major Agricultural Projects in Alberta.....58

HIGHLIGHTS

1. Major resource projects recently constructed, currently under construction or proposed for Alberta during the 1990 to 1999 time period could generate a significant number of jobs for Albertans. To identify the employment impact these projects could have on Alberta's economy, this report outlines specific construction and operational workforce requirements by year. A major resource project in this report is a project that has a value of $10 million or more.

2. In some cases, final project approval and timing of the resource projects may be dependent upon the outcome of environmental reviews, approval of other projects and future economic conditions.

3. Construction and operational workforce requirements of specific resource projects are based on information in Environmental Impacts Assessments (EIAs), estimates provided by companies in 1990 and projections based on similar type projects constructed previously.

4. The largest resource projects currently under construction in Alberta include the $1.2 billion Husky heavy oil upgrader (Lloydminster) and the $3 billion Nova pipeline expansion. During the period between now and 1999 it is anticipated that construction could begin on several other major projects including the $4.1 billion OSLO oil sands plant (Fort McMurray) and upgrader (Edmonton), the $800 million Dow Chemical ethylene project (Edmonton) and the $1 billion Alberta Pacific pulp mill (Athabasca).

5. The oil, pipeline and forestry sectors likely will generate the largest number of construction jobs. The most significant number of operational jobs probably will be generated by the oil and forestry sectors. In the oil sector, the largest number of operational jobs will be in the plant operator, maintenance trade and accounting/purchasing occupations. However, the greatest number of operational jobs created by the forestry projects will be in the woodland, plant operator, maintenance trade, management and millwright occupations.

6. A review of resource projects under construction or proposed for Alberta indicates that the demand for skilled trades workers in the construction industry will increase significantly if construction proceeds on the $4.1 billion OSLO oil sands plant (Fort McMurray) and upgrader (Edmonton) during the 1993 to 1996 period. It is anticipated that this increased demand will create a need for training and recruiting strategies that will provide the province with a significant number of appropriately trained workers.

FIGURE 1.2

ACTUAL AND PROJECTED TIMING OF NEW MAJOR RESOURCE PROJECTS IN ALBERTA, 1980 - 1999 (1)

Sector	Project (Location)	Est. Total Cost ($M)
Oil	AOSTRA (Fort McMurray)	50
	Amoco (Cold Lake Area)	180
	BP (Phase 3) (Wolf Lake)	400
	Esso (Phases 11-12) (Cold Lake)	285
	Esso (Cold Lake Area)	11
	Husky (Lloydminster)	1270
	Husky/AEC (Primrose Lake Air Weapons Range)	20
	Oil Sands Plant (Fort McMurray)	2400
	Syncrude Upgrader (Edmonton)	1700
	Petro-Canada (Edmonton)	82
	Shell (PREP II) (Peace River)	570
	Shell (Virginia Hills)	127
	Suncor (Fort McMurray)	200
	Suncor (Phase 1) (Burnt Lake)	220
	Turbo (Balzac)	15
Gas	AEC (Primrose -North)	30
	AEC (Primrose-South)	30
	AEC - Storage (Suffield)	10
	Alberta Natural Gas Co. Ltd. (Cochrane)	90
	Amoco (Nipisi Lake Area)	10
	Canadian Hunter (Grande Prairie Area)	20
	Coho (Calgary Area)	14
	Esso (West Pembina)	45
	Esso (Bonnie Glen)	32
	Interprovincial Pipeline (Edmonton)	18
	Petro-Canada (Brazeau River)	87
	Shell (Bearberry)	65
	Shell or Husky (Caroline)	700
	Shell (Hamburg)	15
	Total Petroleum (Progress)	10
	Wolcott (Brazeau River)	30
Petro-Chemical	Albchem Industries (Bruderheim)	45
	Albright & Wilson (Grande Prairie)	50
	Can. Occidental Petroleum (Bruderheim)	60
	Dow (Fort Saskatchewan)	600
	Dupont (Gibbons)	120
	Neste Oy (Edmonton)	300
	Nova (Joffre)	35
	Union Carbide (Prentiss)	385
Mining	Carbovan Inc. (Phase 2) (Fort McMurray)	20
	Magnesium Co. (Phase 1) (High River)	110
	Magnesium Co. (Phase 2) (High River)	140
	Magnesium Co. (Phase 3) (High River)	125
Forestry	Alberta Energy Company (AEC) (Slave Lake)	140
	Alberta Newsprint (AEC) (Whitecourt)	378
	Alberta Newsprint (AEC) (Whitecourt)	50
	Alberta Pacific - Pulp Mill (Athabasca)	1000
	Alberta Pacific - Paper Mill (Athabasca)	300
	Consumers Paper Corp. (Radcliff)	30
	Daishowa (Peace River)	500
	Northam (Lac La Biche)	10
	Polyboard Manufacturing Co. (High Prairie)	70
	Procter and Gamble Upgrade (Grande Prairie)	50
	Procter and Gamble Pulp Mill (Gr. Prairie)	315
	Procter and Gamble (Manning)	35
	Sundance (Edson)	20
	Sunpine (Rocky Mountain House)	32
	Weldwood (Hinton)	381
	Weldwood (Hinton)	50
	Y.F. Yu Paper Manu. Co. (High Prairie)	600
Pipeline	Amoco/Foothills Pipeline	30
	Cold Lake Pipeline	80
	Gulf (Edson Area)	28
	Nova	3000
	Trans Mountain	400
Electric Utilities & Dams	Blood Indian Irrigation Proj. (Lethbridge)	65
	Genesee I (Genesee)	630
	Little Bow Dam (Hunten Area)	27
	Oldman Dam (Pincher Creek)	300
	Sheerness II (Sheerness)	370
	Pine Coulee Dam (Granum Area)	35
Agriculture	Cenbra (Lethbridge)	10
	Energy Consulting Inc. (Stettler)	40
	Western Malting (Alix)	30
	TOTAL EST. COST OF RESOURCE PROJECTS	$19.93 Billion

Construction period. Limited construction during period. Construction continues beyond 1999

Construction started before 1980. (1) Includes only actual and announced investment over $10 million

August 27, 1990

Table 1.0
A COMPARISON OF THE PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS
BY RESOURCE SECTOR IN ALBERTA, 1990-1999

Resource Sector	CONSTRUCTION WORKFORCE (IN WORK YEARS)										
	Year										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total 1990-1999
Oil	932	2260	533	848	4930	7970	5237	940	537	470	24657
Forestry	1356	1123	1915	1467	1180	552					7593
Gas	391	479	1213	297							2380
Petrochemical	815	1120	518	525	617	620	156				4371
Mining	48	38	191	76	32	127	64				576
Pipeline	1716	1590	1230	1200	1080	380	620				7816
Electric Utilities & Dams	368	77	590	324	95	20	14	9			1497
Agricultural	23	122	67	5							217
TOTAL	5649	6809	6257	4742	7934	9669	6091	949	537	470	49107

Table 1.1
A COMPARISON OF THE PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS
BY RESOURCE SECTOR IN ALBERTA, 1990-1999

Resource Sector	OPERATIONAL WORKFORCE (CUMULATIVE)										
	Year										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Ongoing Jobs by 1999
Oil	35	278	350	350	350	1578	2492	3236	3320	3390	3390
Forestry	1205	1695	2331	3419	3858	4180	4180	4180	4180	4180	4180
Gas	89	86	136	246	246	246	246	246	246	246	246
Petrochemical	115	203	186	486	486	486	554	554	554	554	554
Mining	78	78	148	224	224	313	359	359	359	359	359
Pipeline	450	514	566	599	618	618	629	619	619	619	619
Electric Utilities & Dams	3	5	5	5	5	7	7	7	7	7	7
Agricultural			43	138	138	138	138	138	138	138	138
TOTAL	1975	2859	3765	5467	5925	7566	8605	9339	9423	9493	9493

August 09, 1990

Figure 1.1
A COMPARISON OF THE PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS
BY RESOURCE SECTOR IN ALBERTA, 1990-1999

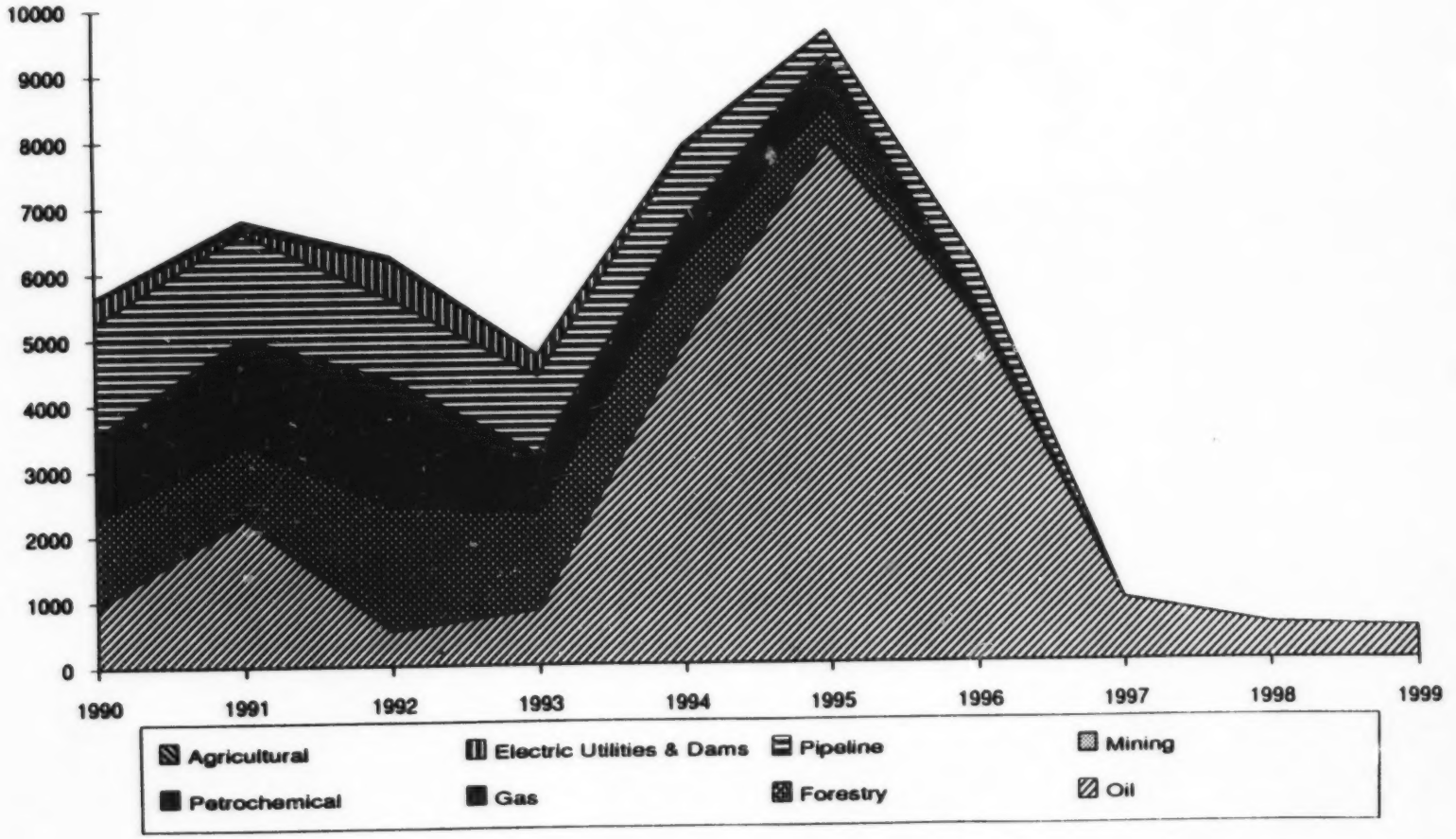


Figure 1.2
A COMPARISON OF THE PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS
BY RESOURCE SECTOR IN ALBERTA, 1990-1999

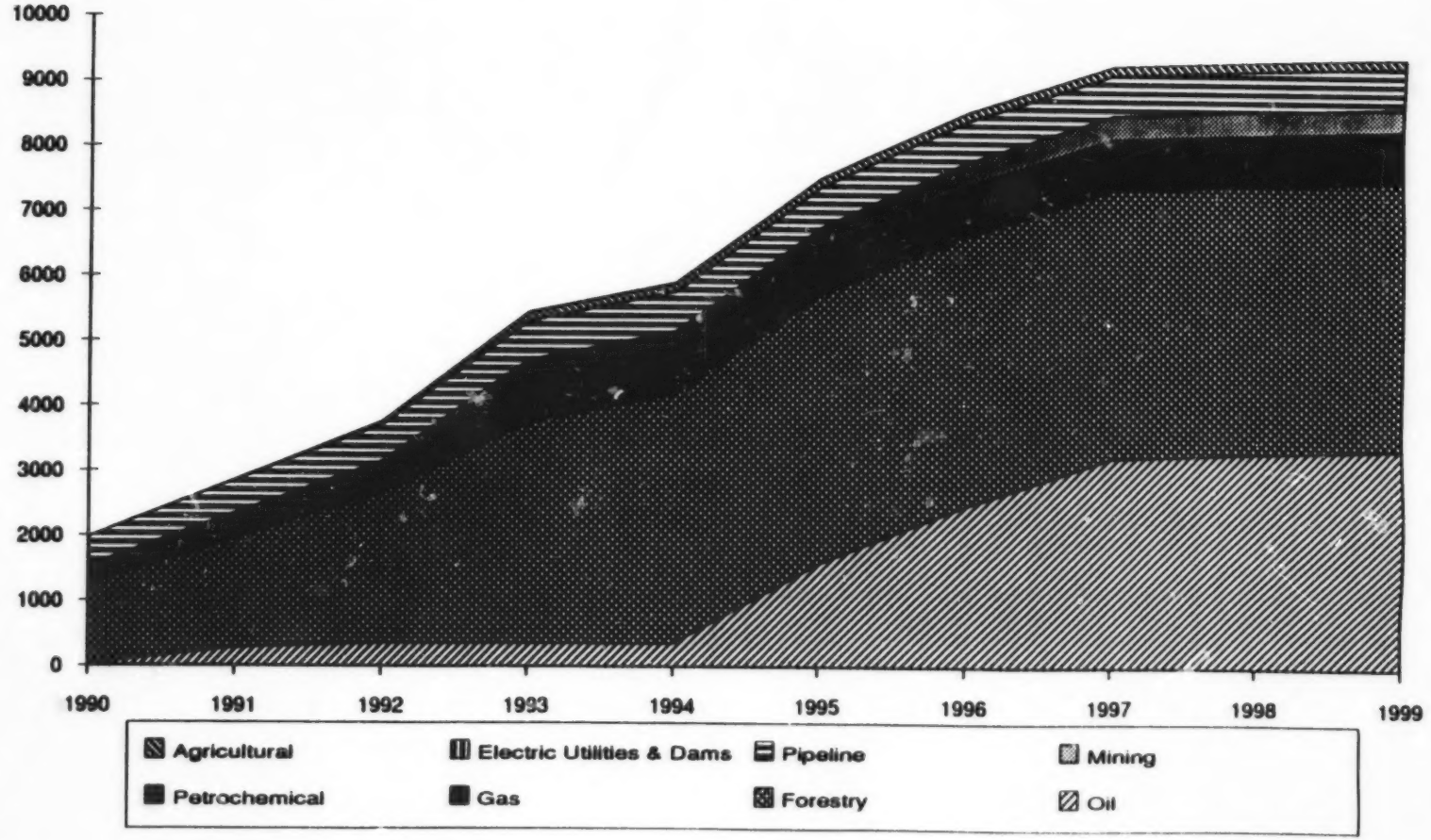


TABLE 1.2

COMPARISON OF PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR RESOURCE PROJECTS IN ALBERTA, 1990-1999 (1)

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker	251	213	115	101	224	347	141	28	14	11	1445
Bricklayer	4	7	19	14	10	5					59
Carpenter	350	383	465	352	587	613	321	61	42	35	3209
Cement Mason	66	51	79	43	43	38	15	8	6	6	355
Drilling Related Occs.	8	13	11		26	78	57	179	115	110	597
Electrician	513	743	608	427	741	815	702	107	72	62	4790
Insulator	146	339	287	167	231	584	581	31	18	15	2399
Ironworker	292	255	312	291	448	547	181	33	21	17	2397
Labourer	909	863	1046	901	1022	967	633	125	48	41	6555
Millwright	193	179	215	158	196	195	51	6	3	3	1199
Oper. Engineer/Teamster	670	705	664	634	1133	1184	867	33	27	22	5939
Other	441	476	586	520	598	766	471	77	34	32	4001
Pipefitter	870	1261	946	509	1389	2009	1006	196	114	94	8394
Sheet Metal	74	33	88	54	77	119	88	18	7	6	564
Supervisory/Support	535	944	513	315	973	1311	880	31	16	16	5534
Welder	327	344	303	256	236	91	97	16			1670
TOTAL WORK YEARS	5649	6809	6257	4742	7934	9669	6091	949	537	470	49107

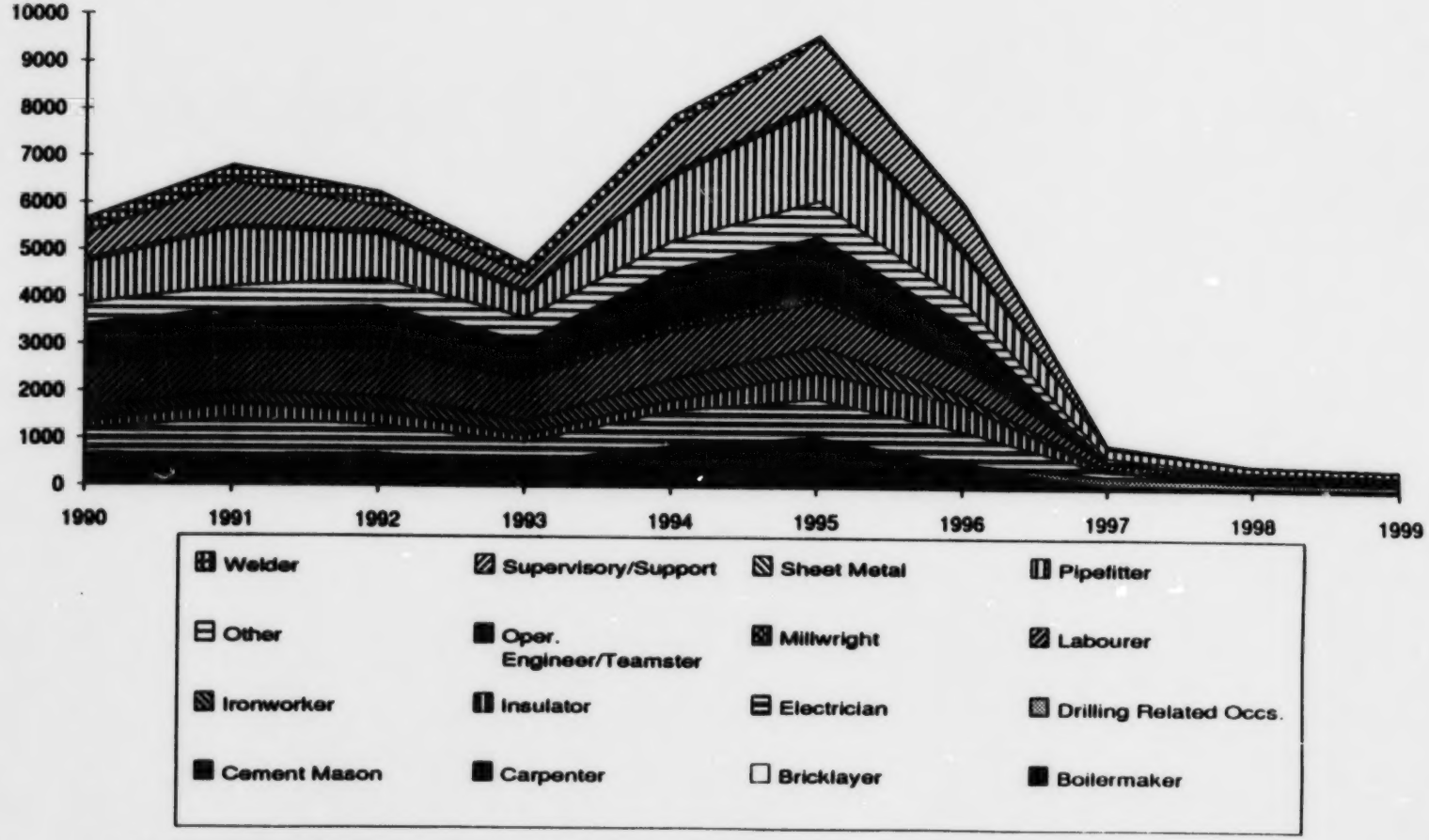
TABLE 1.3

A COMPARISON OF PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR RESOURCE PROJECTS IN ALBERTA, 1990-1999 (1)

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.	46	55	69	95	100	251	331	379	381	382	382
Electrician	34	53	70	98	115	150	174	195	197	199	199
Engineer	108	141	167	241	254	392	476	529	532	534	534
Instrumentation	47	55	69	93	113	183	206	228	233	238	238
Management	131	172	216	299	308	380	414	454	459	463	463
Millwright	68	90	116	159	178	262	314	359	359	359	359
Oilfield Occupations	6	6	6	6	6	53	118	177	198	216	216
Operating Engineer	27	33	44	83	89	98	107	114	114	114	114
Other	69	97	126	327	338	384	418	454	464	471	471
Other Trades	206	279	401	546	568	813	983	1070	1076	1081	1081
Pipefitter	32	46	52	73	73	92	113	127	127	127	127
Plant Operator	433	697	917	1202	1266	1644	1938	2144	2168	2189	2189
Support Staff	162	194	235	326	333	436	503	568	570	572	572
Technical	208	261	314	359	374	534	608	636	640	643	643
Welder	17	26	38	57	73	90	98	101	101	101	101
Woodland Occupations	381	654	925	1503	1737	1804	1804	1804	1804	1804	1804
TOTAL ONGOING JOBS	1975	2859	3765	5467	5925	7566	8605	9339	9423	9493	9493

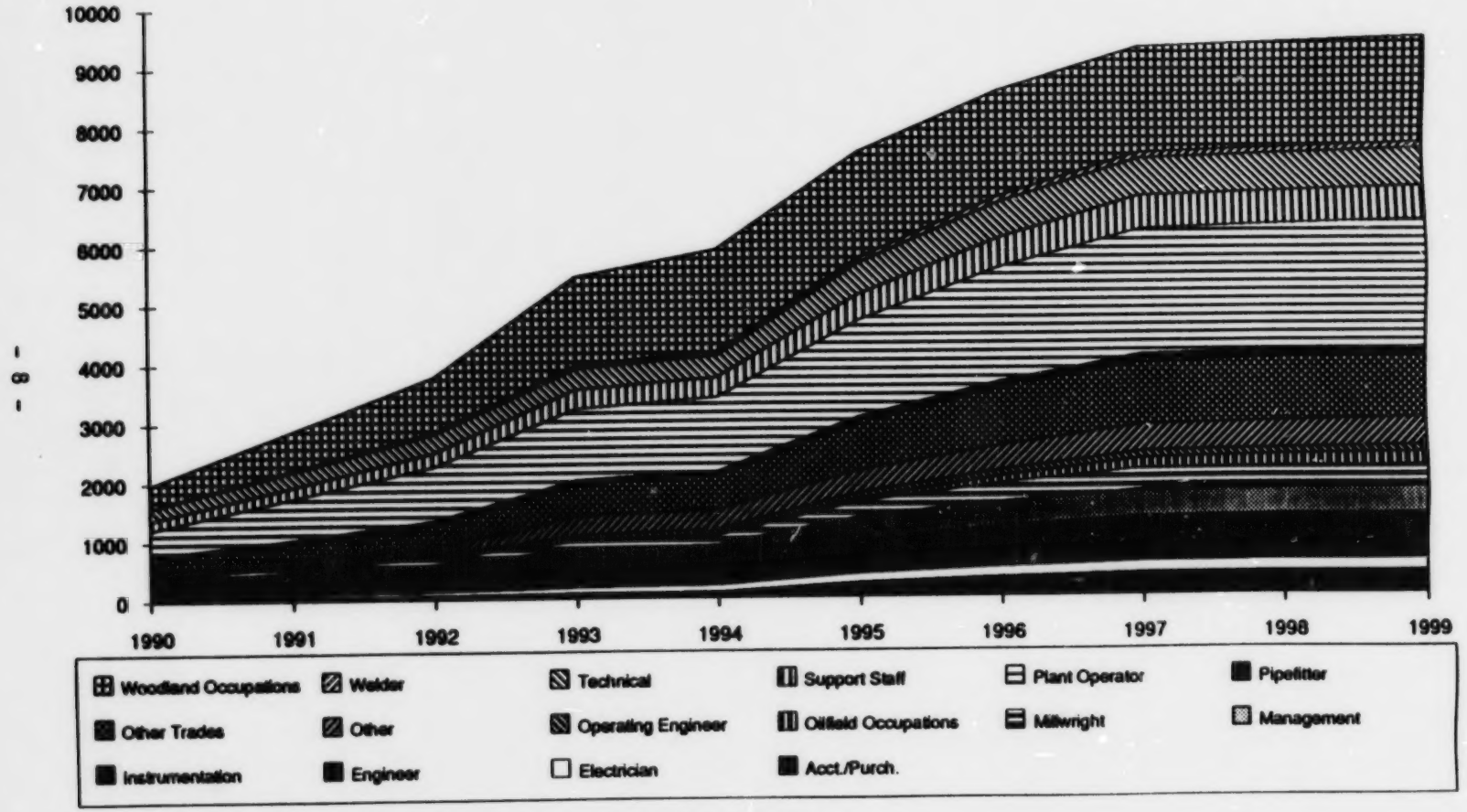
(1) Includes projects in the oil, gas, petrochemical, forestry, mining, electric utilities/dam and pipeline sectors.

Figure 1.3
A COMPARISON OF PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR RESOURCE PROJECTS IN ALBERTA, 1990-1999 (1)



(1) Includes projects in the oil, gas, petrochemical, forestry, mining, electric utilities/dam and pipeline sectors.

Figure 1.4
A COMPARISON OF PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR RESOURCE PROJECTS IN ALBERTA, 1990-1999 (1)



(1) Includes projects in the oil, gas, petrochemical, forestry, mining, electric utilities/dam and pipeline sectors.

Figure 1.5
A COMPARISON OF CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR SELECTED MAJOR RESOURCE PROJECTS

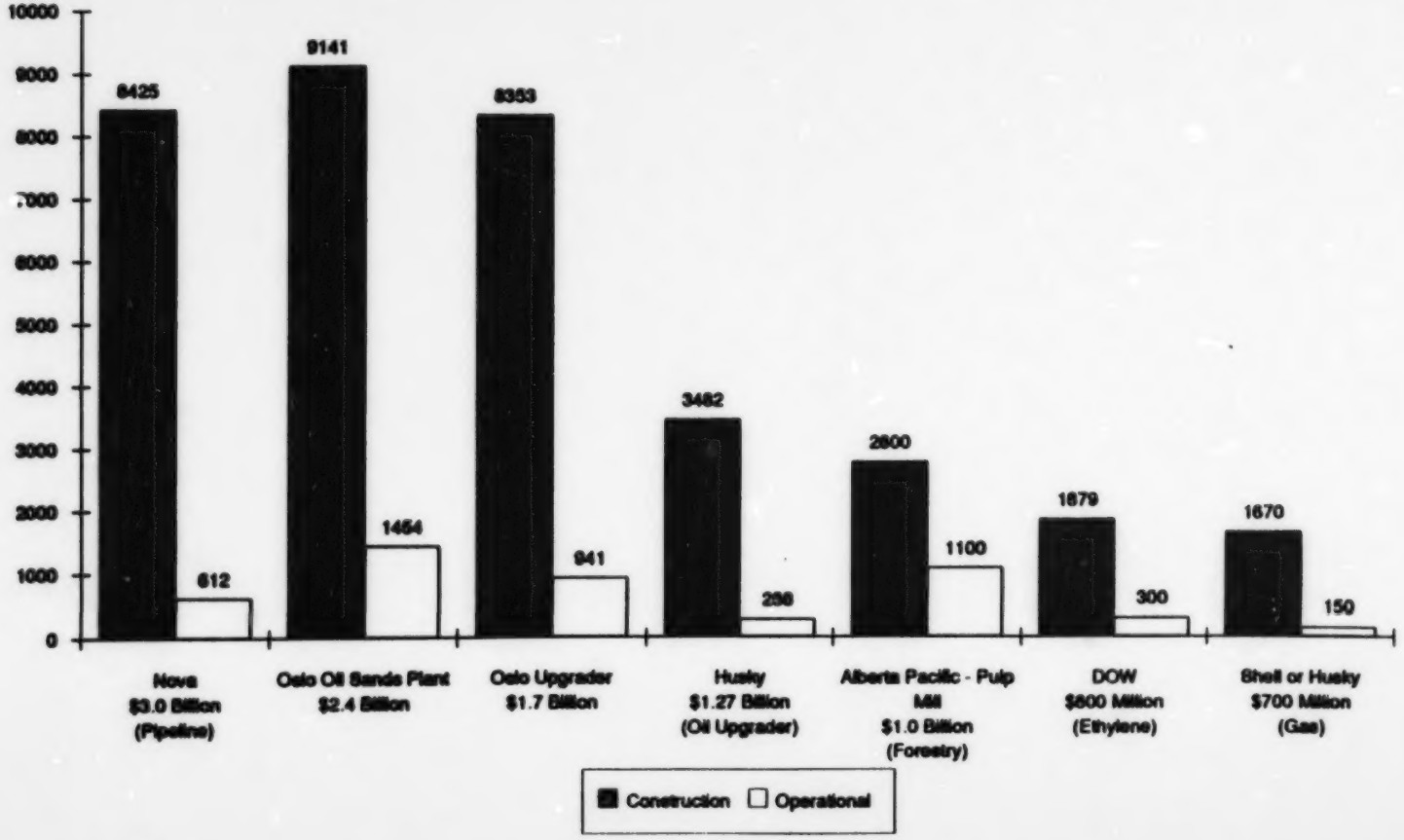


TABLE 1.4

A SUMMARY OF PROJECTED WORKFORCE REQUIREMENTS OF MAJOR RESOURCE PROJECTS IN ALBERTA, 1990 - 0 (1)

Sector	Project		Est. Total Cost ($M)	Construction Work Years		Operation Workforce Ongoing Jobs	
				Total	1990 - 0	Total	1990 - 0
Oil	Amoco (Cold Lake Area)		160	73	200	34	50
	AOSTRA (Fort McMurray)		55	200	73	55	34
	BP (Phase 3) (Wolf Lake)		400	385	385	100	109
	ESSO (Phases 11-12) (Cold Lake)		265	225	225	190	190
	ESSO (Cold Lake Area)	*	11	6	6	7	
	Husky (Lloydminster)	*	1270	3482	3482	288	288
	Husky/AEC (Primrose Lake)	*	20	15	15	10	10
	Oslo Oil Sands Plant (Fort McMurray)		2400	9141	9141	1454	1454
	Oslo Upgrader (Edmonton)		1700	8353	8353	941	941
	Petro-Canada (Edmonton)	*	82	211	86	5	5
	Shell (PREP II) (Peace River)	*	570	2111	1627	280	210
	Shell (Virginia Hills)	*	127	500	7	8	8
	Suncor (Fort McMurray)		200	738	738		
	Suncor (Phase 1) (Burnt Lake)		240	286	286	100	86
	Turbo (Balzac)	*	15	31	15	5	5
Gas	AEC (Primrose North)		30	90	90	6	6
	AEC (Primrose South)		30	100	100	6	6
	AEC (Storage) (Primrose)		10	23	23		
	Alberta Natural Gas Co. (Cochrane)		50	120	120	5	5
	Amoco (Nipisi Lake Area)		10	3	3	1	1
	Canadian Hunter (Grande Prairie Area)	*	20	46	46	5	
	Coho (Calgary)		14	23	23	6	6
	Esso (West Pembina)	*	46	158	8	25	2
	Esso (Bonnie Glen)	*	32	88	27	2	2
	Interprovincial Pipeline (Edmonton)		18	46	46	4	4
	Petro-Canada (Brazeau River)	*	67	111	111	18	18
	Shell (Beartberry)	*	66	120	120	37	37
	Shell (Hamburg)		15	16	21	1	
	Shell or Husky (Caroline)		700	1870	1870	150	150
	Total Petroleum (Proserve)	*	10	12	12	9	9
	Wolcott (Brazeau River)		30	21	9	3	
Petrochemical	Albchem Industries (Bruderheim)		45	38	38	25	
	Albright & Wilson (Grande Prairie)		50	35	35	17	
	Can. Occidental Petroleum (Bruderheim)		60	90	90	29	29
	DOW (Fort Saskatchewan)		600	1870	1870	300	300
	DuPont (Gibbons)		120	278	278	65	65
	Neste Oy (Edmonton)		300	1035	1035	88	88
	Nova (Joffre)		50	97	97	4	4
	Union Carbide (Fraserdale)		300	850	850	68	68
Mining	Carbrown Inc. (Phase 2) (Fort McMurray)		20	40	40	3	3
	Magnesium Co. (Phase 1) (High River)	*	110	178	48	138	78
	Magnesium Co. (Phase 2) (High River)		140	286	286	143	143
	Magnesium Co. (Phase 3) (High River)		135	223	223	135	135
Forestry	Alberta Energy Company (Slave Lake)	*	140	300	275	135	135
	Alberta Newsprint (Whitecourt)	*	370	681	306	375	375
	Alberta Newsprint (Whitecourt)		80	110	110	15	15
	Alberta Pacific - Pulp Mill (Athabasca)		1000	2500	2500	1100	1100
	Alberta Pacific - Paper Mill (Athabasca)		300	1200	1200	200	200
	Consumers Paper Corp (Meadow Lake)		70	70	70	35	35
	Daishowa (Peace River)	*	680	1194	514	680	680
	Northern (Grande Prairie)		110	85	85	140	140
	Pollard Manufacturing Co. (Slave Lake)		70	163	163	295	295
	Procter & Gamble Cellulose (Grande Prairie)		30				
	Procter & Gamble Pulp Mill (Grande Prairie)		311	600	600	300	300
	Procter & Gamble Sawmill		60	120	120	120	120
	Sunpine (Slave Lake)	*	67	67	67	150	150
	Sunpine (Grande Prairie)		50	100	100	287	200
	Weldwood (Hinton)	*	341	1531	76	280	
	Weldwood (Hinton)		80	120	120	80	80
	W.A. Timber Mills Co. (High Prairie)		60	621	621	375	375
Pipeline	Alberta Natural (Calgary)		5	5	5	1	
	Can. Pac. (Calgary)		5	175	175	1	1
	Esso (Edmonton Area)	*	5	64	37	6	6
	Nova	*	300	540	540	612	612
	Trans Mountain		20	10	10	10	
Electric Utilities and Dams	Blood Indian Irrigation Pmp. (Lethbridge)		5	5	5	2	2
	Genesee II (Genesee)	*	600	1200	600	40	
	Little Bow Dam (Nanton Area)		77	200	200		
	Oldman Dam (Pincher Creek)	*	200	70	70	5	5
	Sheerness I (Sheerness)	*	370	180	90	28	
	Pine Coulee Dam (Nanton Area)		70	200	200		
Agriculture	Cargill (Lethbridge)		10	30	30	3	3
	Energy Consulting Inc. (Medley)		40	100	100	110	110
	Western Milling (Alix)		50	97	97	25	25
	TOTAL EST. WORKFORCE REQUIREMENTS		19887	57407	49107	10124	9493

* Construction started before 1990.

(1) Includes only actual and announced investment over $10 million.

August 29, 1990

TABLE 1.5

TYPE OF PRODUCTION OF MAJOR RESOURCE PROJECTS IN ALBERTA, 1990 - 1999 (1)

Sector	Project	Est. Total Cost ($M)	Type of Plant/Production
Oil	Amoco (Cold Lake Area)	160	Heavy oil project
	AOSTRA (Fort McMurray)	50	Oil sands project
	BP (Phase 3) (Wolf Lake)	400	Heavy oil project
	ESSO (Phases 11-12) (Cold Lake)	295	Heavy oil project
	ESSO (Cold Lake Area) *	11	Coal -burning project for heavy oil recovery
	Husky (Lloydminster) *	1270	Heavy oil upgrader
	Husky/AEC (Primrose Lake) *	20	Heavy oil project
	Oslo Oil Sands Plant (Fort McMurray)	2400	Oil sands plant
	Oslo Upgrader (Edmonton)	1700	Upgrader
	Petro-Canada (Edmonton) *	82	Refinery isomerization unit
	Shell (PREP II) (Peace River) *	570	Heavy oil project
	Shell (Virginia Hills) *	127	Enhanced oil recovery unit
	Suncor (Fort McMurray)	200	Oil sands debottlenecking project
	Suncor (Phase 1) (Burnt Lake)	220	Heavy oil project
	Turbo (Balzac) *	15	Upgrade of oil refinery
Gas	AEC (Primrose-North)	30	Natural gas project
	AEC (Primrose-South)	30	Natural gas project
	AEC (Storage) (Primrose)	10	Gas storage facility
	Alberta Natural Gas Co. (Cochrane)	50	Gas straddle plant
	Amoco (Nipisi Lake Area)	10	Gas plant
	Canadian Hunter (Grande Prairie Area) *	20	Gas plant
	Coho (Calgary)	14	Gas plant
	Esso (West Pembina) *	40	Gas plant
	Esso (Bonnie Glen) *	30	Gas plant
	Interprovincial Pipeline (Edmonton)	11	Gas storage and injection facility
	Petro-Canada (Brazeau River) *	57	Sour gas plant
	Shell (Beartberry) *	60	Sour gas plant
	Shell (Hamburg)	15	Gas plant expansion
	Shell or Husky (Caroline)	700	Gas plant and related facilities
	Total Petroleum (Progress) *	10	Gas plant
	Wolcott (Brazeau River)	30	Gas plant expansion
Petrochemical	Allchem Industries (Bruderheim)	40	Sodium chlorate plant
	Albright & Wilson (Grande Prairie)	50	Sodium chlorate plant
	Can. Occidental Petroleum (Bruderheim)	60	Sodium chlorate plant
	DOW (Fort Saskatchewan)	650	Ethylene plant/Fractionation facility
	DuPont (Gibbons)	130	Hydrogen peroxide plant
	Neste Oy (Edmonton)	300	Methyl tertiary butyl ether (mtbe) plant
	Nova (Joffre)	50	Pelletizing plant
	Union Carbide (Prentiss)	380	Ethylene glycol plant
Mining	Carbovan Inc. (Phase 2) (Fort McMurray)	20	Vanadium extraction plant
	Magnesium Co. (Phase 1) (High River) *	110	Magnesium production facility
	Magnesium Co. (Phase 2) (High River)	140	Magnesium facility expansion
	Magnesium Co. (Phase 3) (High River)	170	Magnesium facility expansion
Forestry	Alberta Energy Company (Slave Lake) *	120	Chemithermomechanical (Ctmp) pulp mill
	Alberta Newsprint (Whitecourt) *	370	Newsprint mill
	Alberta Newsprint (Whitecourt)	80	Paper recycling mill
	Alberta Pacific (Phase 1) (Athabasca)	1000	Pulp mill
	Alberta Pacific (Phase 2) (Athabasca)	300	Paper mill
	Consumers Paper Ltd. (Nipisi)	30	Paper recycling mill
	Daishowa (Peace River) *	800	Pulp mill
	Northern Lite (Lac La Biche)	10	Sawmill
	Polyboard Manufacturing Co. (High Prairie)	70	Chipboard plant
	Procter & Gamble (Grande Prairie)	80	Pulp mill expansion and upgrade
	Procter & Gamble (Grande Prairie)	310	Pulp mill
	Procter & Gamble (Manning)	10	Sawmill
	Sundance (Calgary) *	30	Sawmill
	Sundance (Valley Manitoba House)	30	Sawmill complex and wood treatment plant
	Weldwood (Hinton) *	361	Pulp mill
	Weldwood (Hinton)	30	Sawmill
	Y.A.L. Lumber Mills Co. (High Prairie)	60	Pulp and paper mill
Pipeline	Amoco (Caroline - Empress)	50	Compressor station and related facilities
	Calf (Calf - Empress)	30	Water pipeline
	Gulf (Caroline Area) *	20	Gas gathering system
	Nova *	300	Gas pipeline extension
	Trans Mountain	400	Oil pipeline between Edmonton and Vancouver
Electric Utilities and Dams	Blood Indian Irrigation Proj. (Lethbridge) *	30	Irrigation project
	Genesee I (Genesee) *	600	Thermal coal power generating plant
	Little Bow Dam (Vulcan Area)	70	Irrigation dam
	Oldman Dam (Pincher Creek) *	300	Irrigation dam
	Sheerness I (Sheerness) *	370	Thermal coal power generating plant
	Pine Coulee Dam (Crowsnest Area)	90	Irrigation dam
Agriculture	Canbra (Lethbridge)	10	Meal grinding plant expansion
	Energy Consulting Inc. (Strathcona)	40	Greenhouse and generator
	Weldon Milling (Alix)	30	Milling plant
	TOTAL EST. WORKFORCE REQUIREMENTS	18000	

* Construction started before 1990.

(1) Includes only actual and announced investment over $10 million.

August 29, 1990

A Summary of Trade and Occupational Descriptions and Workforce Requirements Related to the Construction and Operation of New Major Resource Projects in Alberta

(All Construction Workforce Requirements are in Work-Years)

The purpose of this section is to provide a description and summary of the major trade requirements related to the construction and operation of new major resource projects now under construction or proposed for Alberta.

A review of resource projects under construction or proposed for Alberta indicates that the demand for skilled trades workers in the construction industry will increase significantly if construction proceeds on the OSLO oil sands plant (Fort McMurray) and upgrader (Edmonton) during the 1993 to 1994 period. The total cost for the two projects is estimated to be $4.1 billion. It is anticipated that this increased demand will create a need for training and recruiting strategies that will provide the province with a significant number of appropriately trained workers.

Accounting/Purchasing Occupations

There are a diverse range of activities and occupations involved with accounting and purchasing in the operations phase. The most commonly cited types of workers that will be needed by companies include accountants, accounting clerks, purchasers and buyers, and purchasing agents. The only projects requiring a significant number of workers in these occupations are the $2.4 billion OSLO oil sands project (128), the $1.7 billion OSLO oil upgrader (125) and the $3 billion Nova pipeline (32) (*).

Boilermaker

The boilermaker builds, tests and repairs air-tight and liquid-tight containers. While boilermakers are essential during the construction phase for heavy oil and oil sands projects, only a few boilermakers, if any, are required during the operations phase according to estimates by the various companies. The Husky heavy oil upgrader, for example, is estimated to require only 3 boilermakers during the operations phase.

In work-years, the largest number of boilermakers required during the construction phase will be for the $1.7 billion OSLO oil upgrader project (349), the $2.4 billion OSLO oil sands plant (309), the $800 million Dow Chemical petrochemical project (149) and the $650 million Genesee I project (145).

(*) Construction costs for the OSLO oil sands plant and upgrader are estimated.

Bricklayer

The bricklayer lays brick, hollow tile and concrete block for buildings or other structures. Bricklayers are not required for the majority of resource projects. For forestry projects, the largest requirement in work-years for this occupational category is estimated to occur with the $500 million Daishowa pulp mill (19) and the $1 billion Alberta Pacific pulp mill (14).

Carpenter

A carpenter works with wood and wood substitutes in the construction of buildings and other structures. A substantial demand exists for carpenters during the construction phase of the new major oil and forestry projects proposed or in progress in Alberta.

In work-years, the largest number of carpenters estimated to be required during the construction phase occurs with the $1.7 billion OSLO oil upgrader (582), the $2.4 billion oil sands plant (502), the $1 billion Alberta Pacific pulp mill (402) and the Daishowa pulp mill (288).

Cement Worker

The cement worker is concerned with pouring and casting concrete at construction sites, levelling and smoothing concrete, erecting steel forms, applying grout and polishing terrazo. In comparison to the pipefitter and electrician trades, the cement worker does not account for a substantial percentage of time-input into constructing the resource projects.

In work-years, the largest number of cement workers estimated to be required during the construction phase occurs with the $3 billion Nova pipeline (80), the $360 million Oldman dam (47),the $1.2 billion Husky upgrader (44), and the $385 million Union Carbide petrochemical project (35).

Drilling Related Occupations

Workers in the drilling related occupations category are needed for heavy oil projects during both the construction and operation phase. The types of workers in drilling related occupations needed the most include drill crew workers, cementers, directional drillers, drilling foremen, well loggers, solids control technicians, drilling engineers and well servicing personnel. The demand for this occupation for heavy oil projects is projected to be limited until the mid-1990s.

Typically, more workers in drilling related occupations are required during the construction phase than in the operation phase. The largest demand for workers in drilling related occupations during the construction phase occurs with the $570 million Shell-Peace River heavy oil project (460).

Electrician

An electrician installs electrical wiring in buildings to supply heat, light and power. During the construction phase, the demand for electricians is estimated to be substantial for several projects involving the oil, forestry, electric utility and gas sectors.

In work-years, the largest number of electricians estimated to be required during the construction phase occurs with the $2.4 billion OSLO oil sands project (965), the $3 billion Nova pipeline (692), the $1.7 billion OSLO oil upgrader (685), the $1.2 billion Husky upgrader (396), the $361 million Weldwood pulp mill (294), the Shell PREP II heavy oil project (283) and the Shell/Husky gas project (227).

During the operations phase, the largest requirements for electricians are estimated to come from the $2.4 billion OSLO oil sands project (34), the $315 million Procter and Gamble pulp mill (20), the $1.7 billion OSLO oil upgrader (19), the $800 million Dow Chemical petrochemical project (15) and the $1.2 billion Husky heavy oil upgrader (9).

Engineer

There are a diverse range of engineering occupations required to operate resource projects. For example, the $2.4 billion OSLO oil sands project is estimated to require 137 engineers while the $1.7 billion OSLO oil upgrader is estimated to require 107 engineers. The types of engineers that would be required for this type of oil sands plant include process engineers, maintenance engineers and mining and geology engineers. The $3 billion Nova pipeline requires an estimated 105 engineering related workers that would involve specialized training. The $800 million Dow Chemical petrochemical project requires an estimated 53 engineers that would include mainly process or chemical engineers and mechanical engineers. The $1 billion Alberta Pacific pulp mill requires an estimated 22 engineers that include control engineers, process engineers, maintenance engineers and project engineers. The $1.2 billion Husky heavy oil upgrader requires an estimated 11 engineers.

Heavy Equipment Operator

Heavy equipment operators or operating engineers operate cranes, hoisting, excavating and earth-moving equipment. The demand for this occupation is primarily during the construction phase. In work-years, the largest number of heavy equipment operators estimated to be required during the construction phase occurs with the $3 billion Nova pipeline (2325), $2.4 billion OSLO oil sands plant (1768), the $1.7 billion OSLO oil upgrader (660), the $700 million Shell/Husky gas project (135) and the $1.2 billion Husky heavy oil upgrader (128). During the operations phase, there is limited demand for heavy equipment operators for projects proposed in the resource sectors.

Instrumentation Occupations

The range of activities of instrumentation occupations includes installing, maintaining, servicing and repairing, measuring and control instruments used at a plant. During the operations phase, the most commonly needed workers in this category included instrument technicians, instrument mechanics and instrument technologists. It is estimated that the major demand for instrumentation workers will be from the $1.7 billion OSLO oil upgrader (58), the $500 million Daishowa pulp mill (30), the $315 Procter and Gamble pulp mill (30) and the $800 million Dow Chemical petrochemical project (11).

Insulator

An insulator installs insulation materials in commercial and industrial structures. In work-years, the largest number of insulators estimated to be required during the construction phase occurs with the $1.7 billion OSLO oil upgrader (767), the $2.4 billion OSLO oil sands plant (386), the $3 billion Nova pipeline (201), the $1 billion Alberta Pacific pulp mill (180), the $1.2 billion Husky heavy oil upgrader (157), the $800 million Dow Chemical petrochemical project (90).

Iron Worker

An ironworker builds, erects, constructs and joins structural steel on buildings. In work-years, the largest number of ironworkers estimated to be required during the construction phase occurs with the $2.4 billion OSLO oil sands project (502), the $1.7 billion OSLO oil upgrader (407), the $3 billion Nova pipeline (240) and the $1 billion Alberta Pacific pulp mill (129).

Labourer

This category includes occupations in labouring or other basic work such as general labour, tree clearing, grubbing and craft helpers, power saw operator, buffer and swamper. In work-years, the largest number of labourers to be required during the construction phase occurs with the $2.4 billion OSLO oil sands project (1050), the $3 billion Nova pipeline (1374), the $1.7 billion OSLO oil upgrader (625), the $1 billion Alberta Pacific pulp mill (607), the $500 million Daishowa pulp mill (390) and the $1.2 billion Husky heavy oil upgrader (275).

Management Occupations

This category includes occupations concerned with managing activities directly related to the operation of the resource projects. This category often includes persons who are fully qualified in a specific occupation but the person is now managing persons in that occupational field. Management of this type for resource projects includes a wide range of occupational fields including maintenance, laboratory work, technical services, accounting, engineering and administration.

It is estimated that the largest number of management occupations created by new resource projects includes the $2.4 billion OSLO oil sands project (54), the $1 billion Alberta Pacific pulp mill (47), the $500 million Daishowa forestry project (44), the $1.7 billion OSLO oil upgrader (30), the $300 million Alberta Pacific paper mill (27) and the $1.2 billion Husky heavy oil upgrader (17).

Millwright

Millwrights install and maintain machinery in factories and other production plants such as an oil or forestry project. Some millwrights will be needed for both the construction and operation phase of a number of the resource projects proposed in Alberta. In work-years, the largest number of millwrights estimated to be required during the construction phase occurs with the $1 billion Alberta Pacific pulp mill (209), the $2.4 billion OSLO oil sands project (124), the $500 million Daishowa pulp mill (119), the $1.7 billion OSLO oil upgrader (85), the $370 million Sheerness power plant (Unit II)(44), and the $1.2 billion Husky heavy oil upgrader (34).

During the operations phase, it is estimated that the largest number of millwright occupations created will be from the $2.4 billion OSLO oil sands project (77), the $1.7 billion OSLO oil upgrader (75), the $500 million Daishowa pulp mill (32), the $1 billion Alberta Pacific pulp mill (31) and the $315 million Procter and Gamble pulp mill (20).

Other

Occupations included in the "Other" category during the construction phase include road builders, site preparation workers, camp operators, building erectors, pile drivers, caterers, surveyors, rodmen and painters. This category was estimated to comprise only a small percentage of the total time input to construct the resource projects. Occupations included in the "Other" category during the operations phase include miscellaneous workers for capital projects, labourers, security guards, janitorial workers, waste disposal workers and vehicle operators. The labourers required for slaughter and fabrication at meat packing plants are also included in this category.

Other Trades

The "Other Trades" category includes occupations pertaining to the operations phase of the resource projects. Occupations in this category include carpenters, plumbers, boilermakers, maintenance personnel, machinists, heavy duty mechanics, warehouse technicians and auto mechanics. There are also occupations that require specialized training such as field operators for pipelines. The demand for trades in the "Other Trades" category is greatest with the $2.4 billion OSLO oil sands project (268). This latter figure includes heavy duty mechanics and warehouse technicians. The $375 million Magnesium project also requires 312 jobs in the "Other Trades" Category. This includes occupations that require specialized training pertaining to reactor, gas handling, E-cell, refinery and casting. The "Other Trades" category generally comprises only a small number of total operation jobs for the remaining resource projects.

Pipefitter

The pipefitter of steamfitter installs steam and hot water heating systems and industrial process piping systems. Pipefitters play a very important role in the construction phase of oil, forestry, petrochemical and electric utility projects as their services are required throughout most of the construction period and their time input comprises a large percentage of the total work-years required to construct the project. In work-years, the largest number of pipefitters estimated to be required during the construction phase occurs with the $1.7 billion OSLO oil upgrader (2032), the $2.4 billion OSLO oil sands plant (1320), the $1.2 billion Husky heavy oil upgrader (1030), the $3 billion Nova pipeline (791), the $1 billion Alberta Pacific pulp mill (360) and the $361 million Weldwood pulp mill (332). During the operations phase the largest demand for pipefitters is estimated to come from the $1.7 billion OSLO oil upgrader (31), the $500 million Daishowa pulp mill (16) and the $1.2 billion Husky heavy oil upgrader (12). Very few pipefitters are required during the operations phase for the majority of the other resource projects.

Plant Operators

Plant operators play a significant and important role in the operation of many of the resource projects. For example, the $2.4 billion OSLO oil sands plant is estimated to require 398 plant operators, while the $1.7 billion OSLO oil upgrader is estimated to require 215 plant operators. For heavy oil projects, the types of job titles contained in this category include plant operator, steam generation plant operator, crude dehydration plant operator, water treatment operator and control room operator. For forestry projects the range of plant operator jobs is much more diverse. A joint study by the Department of Career Development and Employment and the Department of Forestry, Lands and Wildlife entitled Training Needs Associated With Major Forestry Projects in Alberta outlines this wide range of jobs in further detail. For example, the Daishowa and Alberta Newsprint Company forestry projects according to this study require the following range of workers in the "plant operator" category:

Plant Operators for the Daishowa Forestry Project

Wood Handling:	
Materials Handling	4
Log Deck	8
Debarker	8
Chip Handling/Screening	4
Railcar Unloading	2
Mobile Equipment Operator	4
Crane Operator	8
Utility	8
Pulp Mill:	
Head Operator	4
Digester/Washing/Screening Operator	4
O_2 Delign./Bleaching/Chem. Prep. Operator	4
Machine Tender	4
Back Tender/Baling	4
Life Truck Operator, Baling Line	8
Life Truck Operator, Warehouse	2
Tester/Utility	4
Utility, Shift	8
Day	1
Steam/Recovery:	
Shift Engineer	4
Assistant Shift Engineer	4
Recovery Operator	4
Power Boiler/T.G. Operator	4
Recausticizing/Lime Kiln	4
Water/Effluent	1
Tester/Utility	4
Utility, Shift	4
Day	1
TOTAL	119

Plant Operators for the Alberta Newsprint Company Project

CTMP Plant (including steam plant)	24
Paper Machine	36
Finishing, Shipping	24
Material Handling, Yard	10
TOTAL	94

The type of plant operators anticipated to be required for the $1 billion Alberta Pacific forestry pulp mill include the following areas:

Crane Operator	Back Tender
Barker Operator	Baler Man
Deck Extra	Forklift Operator
Hdg. Fuel Driver	Utility
Chip Screening	Pulp Operator
Chip Cat Driver	Chem. Unloading
Machine Tender	Kiln Operator
	Water/Effluent

Sheet Metal

The sheet metal worker works with light gauge sheet metal in the production of heating, ventilating and air conditioning systems. This trade comprises only a small percentage of the construction workforce. In work-years, the largest number of sheet metal workers estimated to be required during the construction phase are the $2.4 billion OSLO oil sands plant (116), the $1.7 billion OSLO oil upgrader (85), the $1 billion Alberta Pacific pulp mill (64), the $361 million Weldwood pulp mill (61) and the $300 million Alberta Pacific paper mill (54).

Supervisory/Support Workers

The "supervisory/support" category pertains to construction occupations. Occupations placed in this category include supervisors, construction superintendents, managers, site engineers, warehouse personnel, inspectors, payroll staff, security foremen, clerical staff, accountants, janitorial work, first aid personnel and nurses. The "supervisory/support" category usually comprises from 3 to 5 per cent of the total construction workforce. Management and design (including engineering) and the commissioning staff for the Husky heavy oil upgrader was also included in this category since the company identified this type of staff as necessary to ensure completion of construction.

Supply Occupations - Oilfield

Oilfield supply occupations pertain to the operations phase of heavy oil projects. Generally, there is slightly more than 1 plant operator at a heavy oil project for every oilfield supply worker. Position titles included in the oilfield supply category include field operators, service right workers, field maintenance, well service planners and field steam operators. During the operations phase, it is estimated that the largest number of oilfield supply workers will be required by the $570 million Shell heavy oil project (72).

Woodlands Occupations

Woodland occupations pertain to the operations phase of forestry projects. Generally, there is slightly more than 1 plant operator at a forestry project for every woodland supply worker. Occupations in the woodlands supply sector include jobs in harvesting, timber, loading, trucking, decking contractor, developing access roads, reforestation and site preparation. During the operations phase, the largest demand for woodland occupations is estimated to come from the $1 billion Alberta Pacific pulp mill (660), the $500 million Daishowa project (300), the $361 million Weldwood project (210), the $379 million Alberta Newsprint Company project (175), and the $600 million Y. F. Yu Paper Manufacturing Company project (175).

Support Staff

The "support staff" category pertains to the operations phase of the resource projects. This includes administration staff, cafeteria workers, library workers, human resource staff, communications staff, first aid workers, emergency services, clerical workers and the relief pool. It comprises only a small percentage of the

operations workforce. The largest demand for "support staff" is estimated to come from the $2.4 billion OSLO oil sands project (110), the $3 billion Nova pipeline (109), the $1.7 billion OSLO oil upgrader (84), the $800 million Dow Chemical petrochemical project (38) and the $1 billion Alberta Pacific pulp mill (36).

Technical Occupations

The "technical" occupational category comprises only a small percentage of the operations workforce. Occupations in this category include data technicians, environmental technologists, medical personnel (e.g. doctors, nurses), lawyers, geologists, general sciences occupations, computer programmers, researchers, lab technicians, surveyors, planning technicians and rig technicians. Resource projects estimated to require the largest number of technical staff include the $3 billion Nova pipeline (208), the $2.4 billion OSLO oil sands plant (118) and the $1.7 billion OSLO oil upgrader (95).

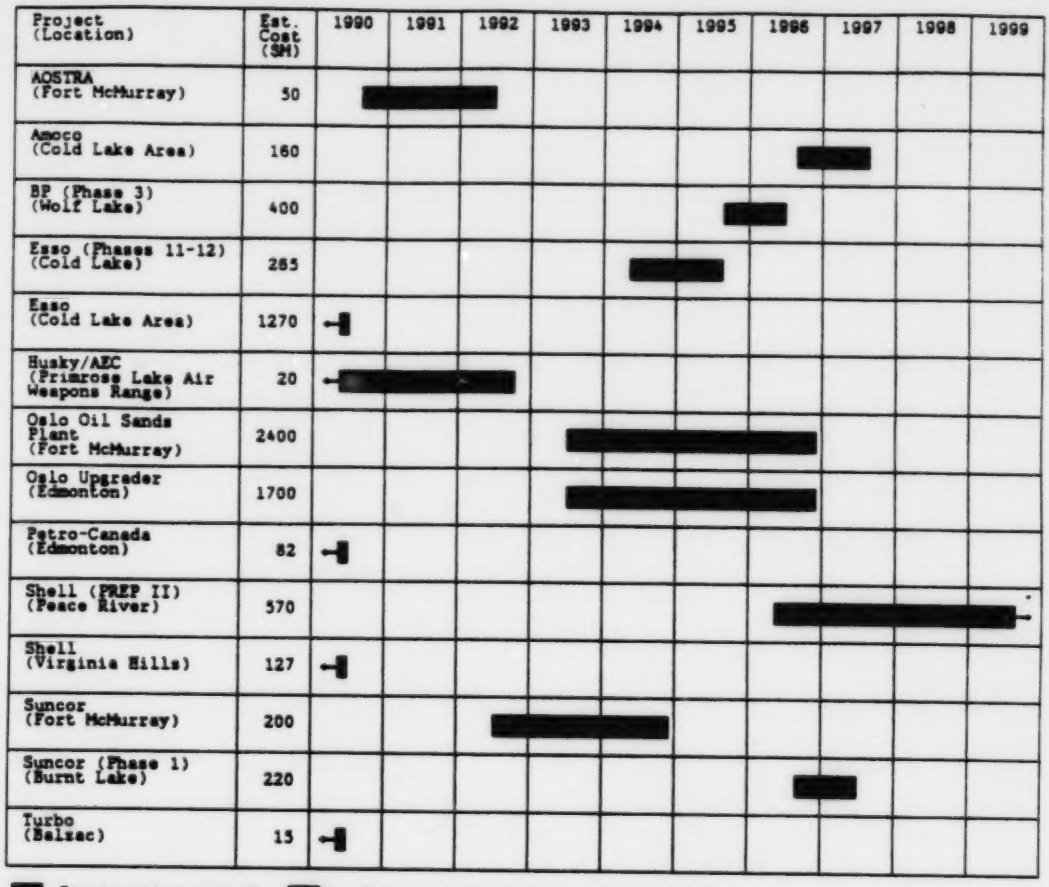
Welder

The welder joins metal together by fusion using an acetylene flame or an electric arc. Information contained on the demand for welder from Environment Impact Assessment (EIAs) and the companies was inconsistent amongst resource projects of the same type. Caution is therefore advised on the numbers contained in this paper since they are based on this information. In work-years, the largest number of welders estimated to be required during the construction phase occurs with the $3 billion Nova pipeline (760) and the $700 million Shell/Husky gas project (86).

PART 2: OIL PROJECTS

FIGURE 2.0

ACTUAL AND PROJECTED TIMING OF NEW OIL PROJECTS IN ALBERTA, 1990 - 1999 (1)



Construction period Construction continues beyond 1999

Construction started before 1990

(1) Includes only actual and announced investment ovvr $10 million.

TABLE 2.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR OIL PROJECTS IN ALBERTA, 1990 - 1999

Project (Phase) (Location)	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Amoco (Cold Lake Area)	160	CONS							20	180		
		OPER								50	50	50
AOSTRA (Fort McMurray)	50	CONS	21	41	11							
		OPER		27	34	34	34	34	34	34	34	34
BP (Phase 3) (Wolf Lake)	400	CONS						230	165			
		OPER							109	109	109	109
ESSO (Phases 11-12) (Cold Lake)	265	CONS					100	125				
		OPER						148	190	190	190	190
ESSO (Cold Lake Area)	11	CONS	6									
		OPER	7	7								
Husky (Lloydminster)	1270	CONS	783	2219	480							
		OPER		216	288	288	288	288	288	288	288	288
Husky/AEC (Primrose Lake)	20	CONS	15									
		OPER	10	10	10	10	10	10	10	10	10	10
Oslo Oil Sands Plant (Fort McMurray)	2400	CONS				468	2480	3847	2346			
		OPER						549	1068	1454	1454	1454
Oslo Upgrader (Edmonton)	1700	CONS				109	1925	3768	2551			
		OPER						531	775	941	941	941
Petro-Canada (Edmonton)	82	CONS	85									
		OPER	5	5	5	5	5	5	5	5	5	5
Shell (PREP II) (Peace River)	570	CONS							40	580	537	470
		OPER								70	140	210
Shell (Virginia Hills)	127	CONS	7									
		OPER	8	8	8	8	8	8	8	8	8	8
Suncor (Fort McMurray)	200	CONS			42	271	425					
		OPER										
Suncor (Phase 1) (Burnt Lake)	220	CONS							115	180		
		OPER								72	86	86
Turbo (Balzac)	15	CONS	15									
		OPER	5	5	5	5	5	5	5	5	5	5
TOTAL OIL PROJECTS	7490	CONS	932	2260	533	848	4930	7970	5237	940	537	470
		OPER	35	278	350	350	350	1578	2492	3236	3320	3390

CONS - Construction
OPER - Operation

August 22, 1990

TABLE 2.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC OIL PROJECTS IN ALBERTA, (1)

PROJECT PHASE	Amoco	AOSTRA	BP Phase 3	ESSO Phases 11-12	ESSO	Husky	Husky/AEC	Oslo Oil Sands Plant	Oslo Upgrader	Petro-Canada	Shell PREP II	Shell	Suncor	Suncor Phase I	Turbo	Total Work Years
COST	180	80	400	265	11	1270	20	2400	1700	82	570	127	200	220	15	
TRADE																
Boilermaker		11	17	6		210		309	349	3	53	10	21	2	2	990
Bricklayer																
Carpenter	1	8	17	7	1	246		502	582	12	164	20	68	8		1637
Cement Mason		1	3	4		44				2	26	8	7	1		96
Drilling Related Occs.	25	36	61	58							460	50		50		760
Electrician	2	11	36	16	1	366	2	953	683	37	283	49	95	10	4	2585
Insulator	1	3	10	4		157	2	388	767	17	69	15		6		1442
Ironworker	3	8	23	8	1	103		502	407	7	81	15	103	11		1252
Labourer	17	18	36	20		275	2	1050	625	21	186	112	115	91	2	2567
Millwright		1	2	4		54		124	85	2	13	15	17	2	1	302
Oper. Engineer/Teamster	3	12	17	8		128	4	1768	680	9	101	25	108	5		2847
Other	10	18	44	22	1			680	728	5	144	38	13	28	5	1739
Pipefitter	6	48	103	43	1	1030	1	1320	2032	58	437	85	119	36	11	5333
Sheet Metal	2	4		6				116	85		28	10		10		261
Supervisory/Support	3	8	23	10	1	859	2	1419	1350	14	66	43	30	14	2	3845
Welder	5	3		3			3			23		5	42	21	4	107
TOTAL WORK YEARS	75	200	385	225	6	3482	15	9141	8353	211	2111	500	738	295	31	25776

(1) Includes estimated workforce requirements to construct total project.

TABLE 2.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC OIL PROJECTS IN ALBERTA, (2)

PROJECT PHASE	Amoco	AOSTRA	BP Phase 3	ESSO Phases 11-12	ESSO	Husky	Husky/AEC	Oslo Oil Sands Plant	Oslo Upgrader	Petro-Canada	Shell PREP II	Shell	Suncor	Suncor Phase I	Turbo	Total Ongoing Jobs
COST	180	80	400	265	11	1270	20	2400	1700	82	570	127	200	220	15	
TRADE																
Acc./Purch.	1	3	3	3		8		128	125		4			3		275
Electrician	3	1	4	6		8		34	19		6			2		85
Engineer	7	3	3	5		11		137	107	1	8			7		289
Instrumentation		1	6	15		3		10	56		20			3		116
Management	2	5	4	8	1	17		54	30		16			4		141
Millwright	1		6	1		6		77	75		1			2		169
Other Occupations		14	30	57			5	29			72			24		231
Operation Engineer								14								14
Other	6	1	6	6		5		58	16		27			9		159
Other Trades		1	12	6		20		268	72		20			4		405
Pipefitter		1	2			12		12	31			1		1		60
Plant Operator	13	12	28	60	6	176	5	366	215	3	84	6		30	5	1045
Support Staff	2	7	2	6		12		110	84	1	6			6		240
Technical		1	3	11		4		116	85		12	1		4		248
Welder						4		7	12					1		24
Woodland Occupations																
TOTAL ONGOING JOBS	34	50	109	190	7	289	10	1454	941	5	280	8		100	5	3481

(2) Includes estimated workforce requirements to operate projects when completed.

August 15, 1990

TABLE 2.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR OIL PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker	90	124	1	28	194	342	138	28	14	11	970
Bricklayer											
Carpenter	129	93	39	54	343	493	287	61	42	35	1576
Cement Mason	21	17	8	3	5	4	3	8	6	6	81
Drilling Related Occs.	8	13	4		26	78	57	179	115	110	590
Electrician	49	306	66	91	443	643	623	107	72	62	2462
Insulator	33	137	1		82	528	561	31	18	15	1406
Ironworker	51	47	13	104	299	468	161	33	21	17	1214
Labourer	167	106	40	234	539	642	463	121	48	41	2401
Millwright	8	28	1	11	67	119	37	6	3	3	283
Oper. Engineer/Teamster	49	74	23	124	806	994	644	31	27	22	2794
Other	9	6	3	95	308	678	426	76	34	32	1665
Pipefitter	146	656	266	63	984	1668	921	196	114	94	5108
Sheet Metal	2	1	1		35	89	88	18	7	6	247
Supervisory/Support	159	650	65	29	771	1221	820	30	16	16	3777
Welder	11	2	2	12	30	3	8	15			83
TOTAL WORK YEARS	932	2260	533	848	4930	7970	5237	940	537	470	24657

TABLE 2.4

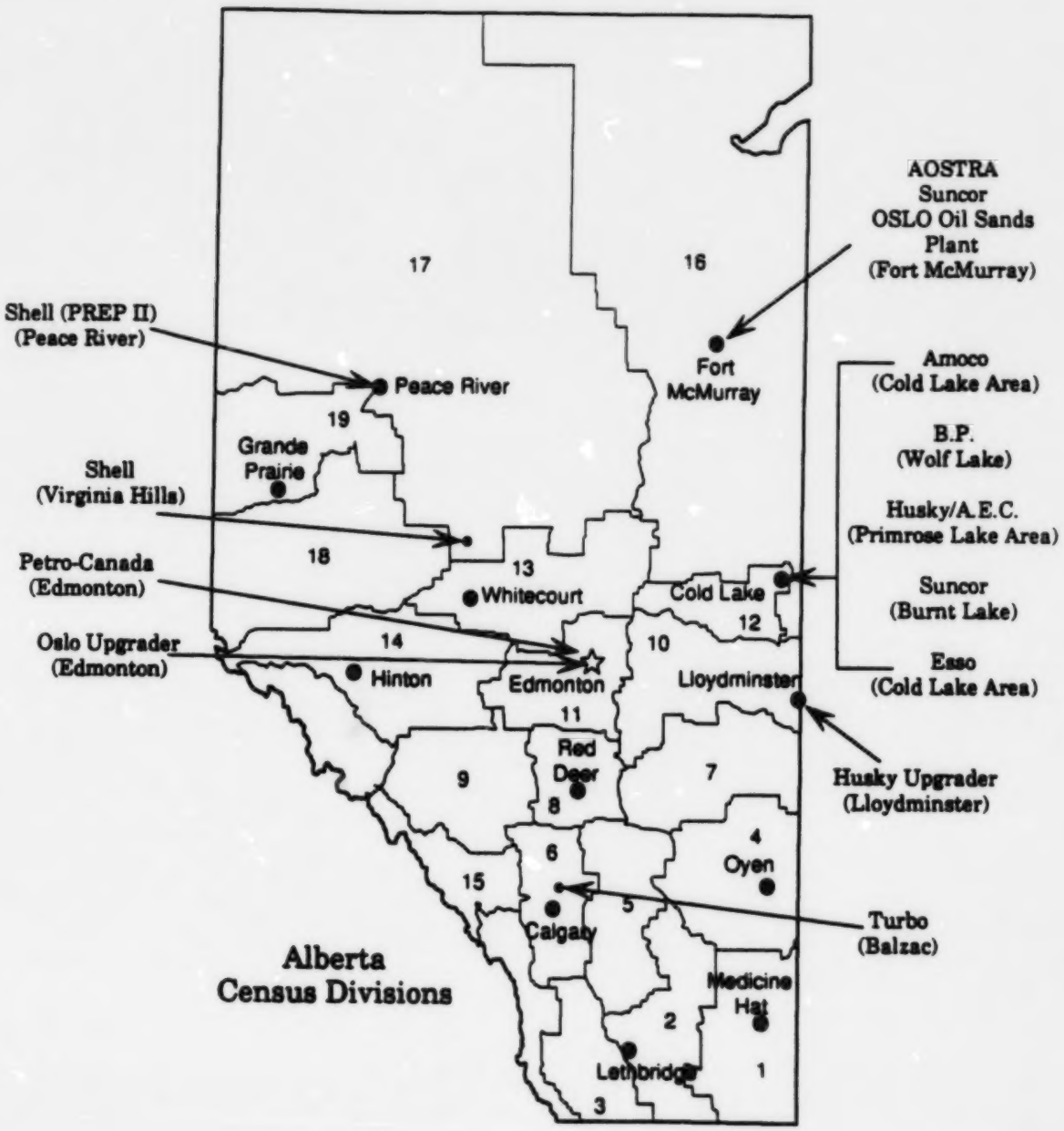
PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR OIL PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.		5	7	7	7	150	222	271	273	274	274
Electrician		9	11	11	11	35	58	79	81	83	83
Engineer	1	15	19	19	19	149	227	282	285	287	
Instrumentation		3	3	3	3	60	79	101	106	111	111
Management	1	17	19	19	19	57	86	127	132	136	136
Millwright		6	7	7	7	73	124	169	169	169	169
Oilfield Occupations	5	5	5	5	5	52	112	171	192	210	210
Operating Engineer						4	7	14	14	14	14
Other		8	11	11	11	45	77	113	123	130	130
Other Trades		17	20	20	20	168	300	389	395	400	400
Pipefitter	1	12	13	13	13	28	46	60	60	60	60
Plant Operator	25	161	211	211	211	491	760	966	990	1011	1011
Support Staff	1	13	15	15	15	108	165	232	234	236	236
Technical	1	4	5	5	5	146	209	239	243	246	246
Welder		3	4	4	4	12	20	23	23	23	23
Woodland Occupations											
TOTAL ONGOING JOBS	35	278	350	350	350	1578	2492	3236	3320	3390	3390

August 15, 1990

Figure 2.1

Location of Major Oil Projects in Alberta



PART 3: GAS PROJECTS

FIGURE 3.0

ACTUAL AND PROJECTED TIMING OF NEW MAJOR GAS PROJECTS IN ALBERTA, 1990 - 1999 (1)

Project (Location)	Est. Cost ($M)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Alberta Energy Co. (Primrose - North)	30	■									
Alberta Energy Co. (Primrose - South)	30			■							
Alberta Energy Co. Storage (Suffield)	10		■								
Alberta Natural Gas Co. Ltd. (Cochrane)	50				■						
Amoco (Nipisi Lake Area)	10	←■									
Canadian Hunter (Grande Prairie Area)	20	←■									
Coho (Calgary Area)	14	■									
Esso (West Pembina)	45	←■									
Esso (Bonnie Glen)	32	←■									
Interprovincial Pipeline (Edmonton)	40		■								
Petro-Canada (Brazeau River)	67	←■									
Shell (Bearberry)	65	←■									
Shell or Husky (Caroline)	700		■	■	■						
Shell (Hamburg)	15		■								
Total Petroleum (Progress)	10	←■									
Wolcott (Brazeau River)	30	■									

■ Construction period ←■ Construction started before 1990

(1) Includes only actual and announced investment over $10 million.

TABLE 3.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR GAS PROJECTS IN ALBERTA, 1990 - 1999

Project	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
AEC (Primrose-North)	30	CONS	90									
		OPER	6	6	6	6	6	6	6	6	6	6
AEC (Primrose-South)	30	CONS			100							
		OPER			6	6	6	6	6	6	6	6
AEC (Storage) (Primrose)	10	CONS		25								
		OPER										
Alberta Natural Gas Co. (Cochrane)	50	CONS			60	60						
		OPER				5	5	5	5	5	5	5
Amoco (Nipisi Lake Area)	10	CONS	5									
		OPER	1	1	1	1	1	1	1	1	1	1
Canadian Hunter (Grande Praire Area)	20	CONS	46									
		OPER	5									
Coho (Calgary)	14	CONS	23									
		OPER	6	6	6	6	6	6	6	6	6	6
Esso (West Pembina)	45	CONS	8									
		OPER	2	2	2	2	2	2	2	2	2	2
Esso (Bonnie Glen)	32	CONS	27									
		OPER	2	2	2	2	2	2	2	2	2	2
Interprovincial Pipeline (Edmonton)	18	CONS		46								
		OPER		4	4	4	4	4	4	4	4	4
Petro-Canada (Brazeau River)	67	CONS	11									
		OPER	18	18	18	18	18	18	18	18	18	18
Shell (Bearberry)	65	CONS	120									
		OPER	37	37	37	37	37	37	37	37	37	37
Shell (Hamburg)	15	CONS	5	16								
		OPER		1								
Shell or Husky (Caroline)	700	CONS		380	1053	237						
		OPER			45	150	150	150	150	150	150	150
Total Petroleum (Progress)	10	CONS	12									
		OPER	9	9	9	9	9	9	9	9	9	9
Wolcott (Brazeau River)	30	CONS	44	12								
		OPER	3									
TOTAL GAS PROJECTS	1146	CONS	391	479	1213	297						
		OPER	89	86	136	246	246	246	246	246	246	246

CONS - Construction
OPER - Operational

July 31, 1990

TABLE 3.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC GAS PROJECTS IN ALBERTA, (1)

PROJECT	AEC North	AEC South	AEC Bisnago	Alberta Natural Gas Co.	Amoco	Canadian Hunter	Coho	Esso	Esso	Interprovincial Pipeline	Pan-Canada	Shell	Shell	Shell or Husky	Total Petroleum	Wolcott	Total Work Years
COST	35	35	10	35	10	25	14	45	35	10	67	85	15	700	10	30	1116
TRADE																	
Bricklayer				6				5	3			5	1	35		1	56
Carpenter	5	6	1	6				11	2	1	1	6	1	84	1	1	125
Cement Mason	2	3	1	1		1	1	2	2			2		26			41
Drilling Related Ops		7															7
Electrician	5	6	4	12	1	6	2	20	12	2	2	16	2	227	1	6	336
Insulator			2	4		2	1	14	2	2	1	10	1	170	1	2	213
Ironworker	6	7	2	7	1	4	2	6	2	2		6	1	111	1	5	167
Labourer	6	7	2	14	1	6	3	21	4	16	1	11	1	380	2	8	488
Millwright	2	2	1	4		2	1		2	2		2	2	20		2	45
Oper. Engineer/Teamster	7	6	2	7		2	1	6	2	2		2	1	135	1	3	184
Other	6	10	1	7		4	1	14	1	2		1		70		4	127
Pipefitter	17	16	2	20	1	11	2	20	16	2	2	20	2	231	2	10	419
Sheet Metal	2	2		2				2	1			2	1				21
Supervisory/Support	6	7	2	6		2	2	20	2	2	1	2	2	112	1	4	185
Welder	17	20	2	6	1	6	2	11	6	2	2	12	1	86	2	4	184
TOTAL WORK YEARS	80	169	20	135	6	45	30	150	65	45	11	128	16	1670	12	64	2572

(1) Includes estimated workforce requirements to construct total project.

TABLE 3.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC GAS PROJECTS IN ALBERTA, (2)

PROJECT	ABC North	ABC South	ABC Bisnago	Alberta Natural Gas Co.	Amoco	Canadian Hunter	Coho	Esso	Esso	Interprovincial Pipeline	Pan-Canada	Shell	Shell	Shell or Husky	Total Petroleum	Wolcott	Total Ongoing Jobs
COST	35	35	10	35	10	25	14	45	35	10	67	85	15	700	10	30	
TRADE																	
Asst./Parts														2			2
Electrician								3			1	1		3			7
Engineer												2		4			3
Instrumentation						1		3	1			1		7		1	14
Management						1				1		4		13			19
Millwright								2				1		5			8
Oilfield Occupations																	
Operating Engineer												6		23			29
Other														11	1		16
Other Trades						1	2		1	2							4
Pipefitter												2		2			
Plant Operator	6	6		6	1	2	4	16		1	16	16	1	52	6	2	140
Support Staff											1	1		20			22
Technical												2		7			9
Welder														1			1
Woodland Occupations																	
TOTAL ONGOING JOBS	6	6		6	1	5	6	25	2	4	18	37	1	150	6	3	278

(2) Includes estimated workforce requirements to operate projects when completed.

July 31, 1989

TABLE 3.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR GAS PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker	6	6	28	11							51
Bricklayer											
Carpenter	19	21	63	15							118
Cement Mason	9	7	20	4							40
Drilling Related Occs.			7								7
Electrician	45	63	155	39							302
Insulator	24	47	109	25							205
Ironworker	27	32	81	19							159
Labourer	36	102	235	58							431
Millwright	11	10	18	5							44
Oper. Engineer/Teamster	18	41	93	24							176
Other	19	22	57	14							112
Pipefitter	84	68	173	52							377
Sheet Metal	9	1	7	1							18
Supervisory/Support	36	28	94	13							171
Welder	48	31	73	17							169
TOTAL WORK YEARS	391	479	1213	297							2380

TABLE 3.4

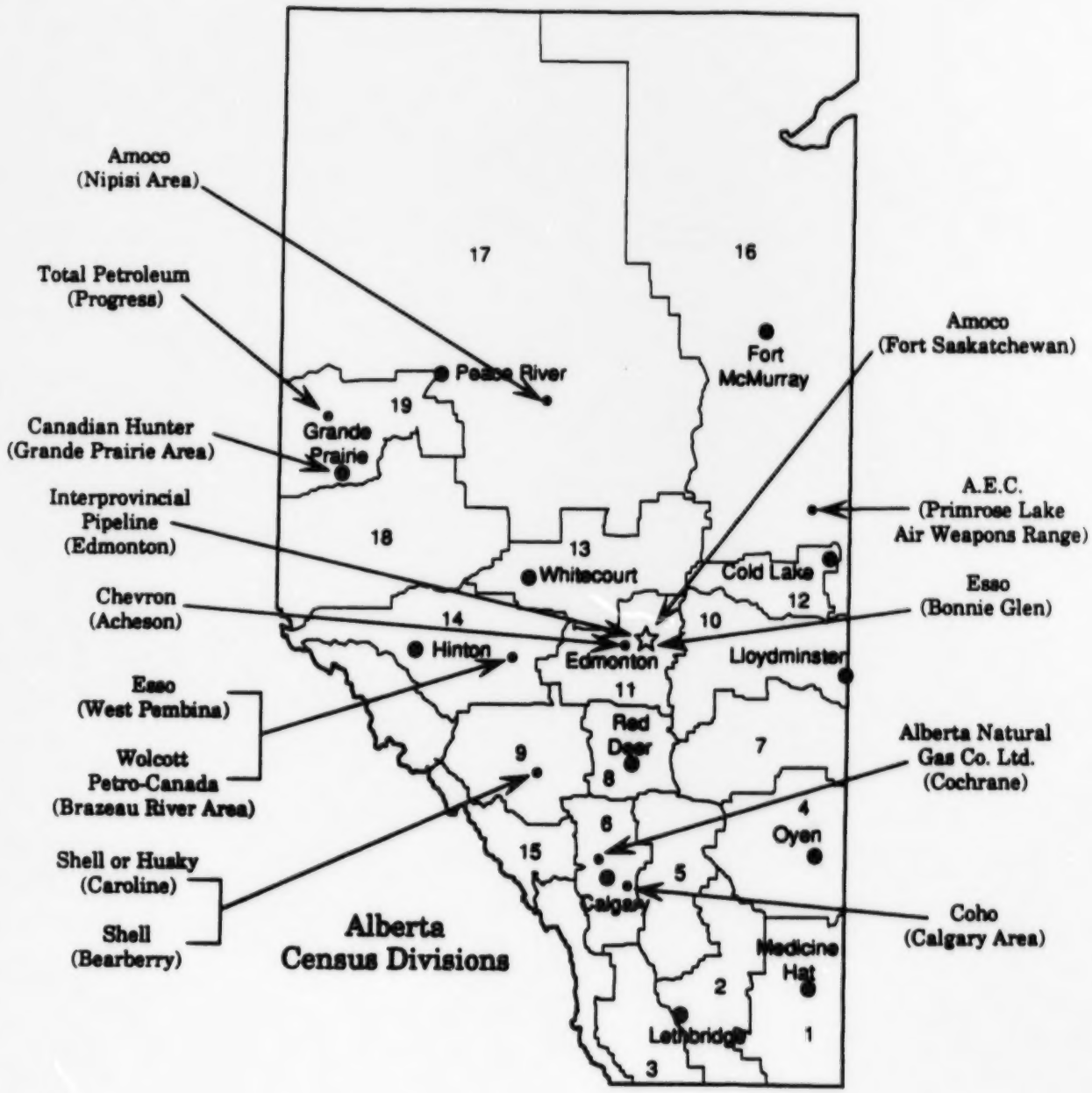
PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR GAS PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.			1	2	2	2	2	2	2	2	2
Electrician	3	3	4	6	6	6	6	6	6	6	6
Engineer	1	1	3	5	5	5	5	5	5	5	5
Instrumentation	5	3	7	10	10	10	10	10	10	10	10
Management	5	5	10	18	18	18	18	18	18	18	18
Millwright	1	1	4	6	6	6	6	6	6	6	6
Oilfield Occupations	1	1	1	1	1	1	1	1	1	1	1
Operating Engineer											
Other	6	6	9	29	29	29	29	29	29	29	29
Other Trades	4	5	9	16	16	16	16	16	16	16	16
Pipefitter	2	2	3	4	4	4	4	4	4	4	4
Plant Operator	57	55	74	117	117	117	117	117	117	117	117
Support Staff	2	2	7	22	22	22	22	22	22	22	22
Technical	2	2	4	9	9	9	9	9	9	9	9
Welder				1	1	1	1	1	1	1	1
Woodland Occupations											
TOTAL ONGOING JOBS	89	86	136	246	246	246	246	246	246	246	246

July 26, 1990

Figure 3.1

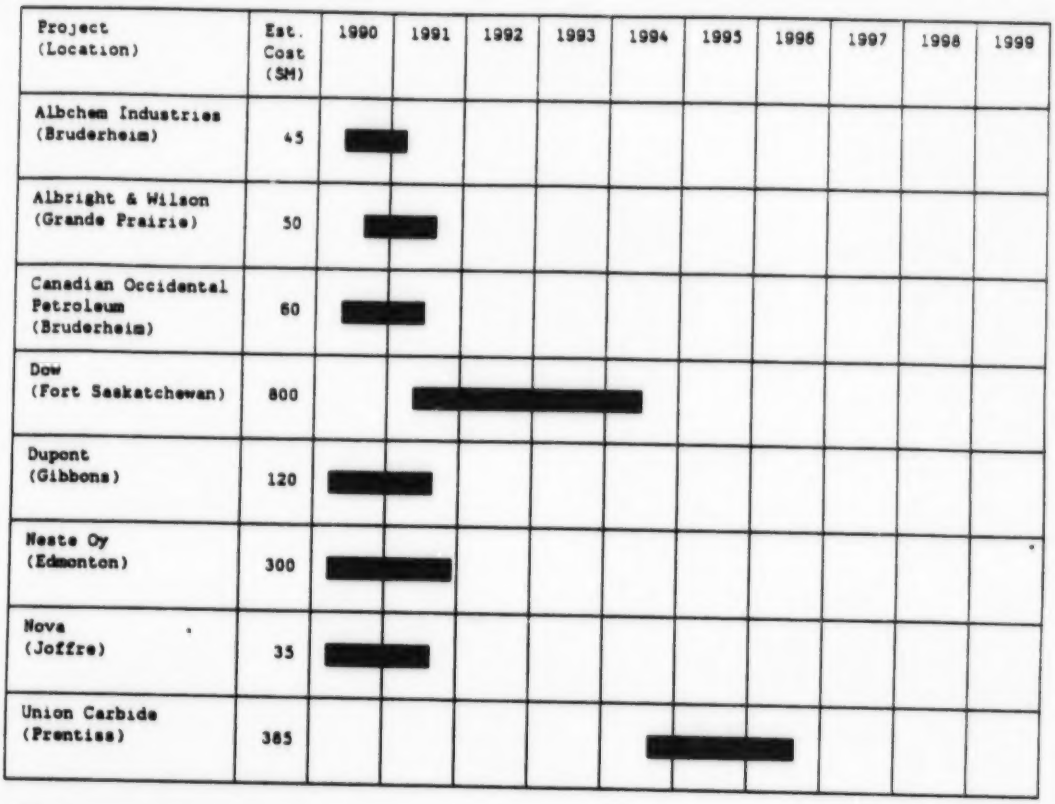
Location of Major Gas Projects in Alberta



PART 4: PETROCHEMICAL PROJECTS

FIGURE 4.0

ACTUAL AND PROJECTED TIMING OF NEW MAJOR PETROCHEMICAL PROJECTS IN ALBERTA, 1990 - 1999 (1)



(1) Does not include projects completed in 1989. Includes only actual and announced investment to be spent during the period from 1990 to 1999.

Table 4.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR PETROCHEMICAL PROJECTS IN ALBERTA, 1990 - 1999

Project (Location)	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Albchem Industries (Bruderheim)	45	CONS	31	5								
		OPER	25									
Albright & Wilson (Grande Prairie)	50	CONS	8	27								
		OPER		17								
Can. Occidental Petroleum (Bruderheim)	60	CONS	60	30								
		OPER	10	29	29	29	29	29	29	29	29	29
DOW (Fort Saskatchewan)	800	CONS	13	358	510	525	460	13				
		OPER				300	300	300	300	300	300	300
DuPont (Gibbons)	120	CONS	243	35								
		OPER	53	65	65	65	65	65	65	65	65	65
Neste Oy (Edmonton)	300	CONS	405	623	8							
		OPER	23	88	88	88	88	88	88	88	88	88
Nova (Joffre)	35	CONS	55	42								
		OPER	4	4	4	4	4	4	4	4	4	4
Union Carbide (Prentiss)	385	CONS					157	607	156			
		OPER							68	68	68	68
TOTAL PETROCHEMICAL PROJECTS	1795	CONS	815	1120	518	525	617	620	156			
		OPER	115	203	186	486	486	486	554	554	554	554

CONS - Construction
OPER - Operation

July 30, 1990

TABLE 4.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC PETROCHEMICAL PROJECTS IN ALBERTA, (1)

PROJECT	Albchem Industries	Albright & Wilson	Can. Occidental Petroleum	DOW	DuPont	Neste Oy	Nova	Union Carbide	Total Work Years
COST	45	50	60	800	120	300	35	385	1795
TRADE									
Boilermaker		1	5	149	11	86			252
Bricklayer		1							1
Carpenter	1	1	10	248	15	94	2	46	417
Cement Mason	1		1		5	11	1	35	54
Drilling Related Occs.									
Electrician	6	6	8	197	37	97	11	113	475
Insulator		1	6	90	18	36	6	40	195
Ironworker	4	1	7	89	18	90	4	38	249
Labourer	1	5	7	179	21	139	10	175	537
Millwright	3	1	1	37	11	26	2	30	111
Oper. Engineer/Teamster	1	1	7	149	23	61	4	30	276
Other	1		2	258	3	59	3	16	342
Pipefitter	9	9	27	204	106	239	36	327	957
Sheet Metal		1					7		8
Supervisory/Support	4	7	3	150	14	31	5	30	244
Welder	5		6	129		67	6	40	253
TOTAL WORK YEARS	36	35	90	1879	278	1036	97	920	4371

(1) Includes estimated workforce requirements to construct total project.

TABLE 4.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC PETROCHEMICAL PROJECTS IN ALBERTA, (2)

PROJECT	Albchem Industries	Albright & Wilson	Can. Occidental Petroleum	DOW	Du Pont	Neste Oy	Nova	Union Carbide	Total Ongoing Jobs
COST	45	50	60	800	120	300	35	385	
TRADE									
Acct./Purch.	1			11	2	2	1	7	24
Electrician	2	2	1	15	3	2			25
Engineer	2	2	1	53	4	9		4	75
Instrumentation			1	11	4	5	1	3	25
Management	5	5	5	13	3	2			33
Millwright	1		1	9	2	4	1	1	19
Oilfield Occupations								5	5
Operating Engineer				3	6			5	14
Other		1		22					23
Other Trades		1	1	23					25
Pipefitter	2	1	1	11	4	3	1	3	26
Plant Operator	10	4	14	64	29	27		25	173
Support Staff	1	1	2	38	3	11		7	63
Technical			1	16	2	21		8	48
Welder	1		1	11	3	2			18
Woodland Occupations									
TOTAL ONGOING JOBS	25	17	29	300	85	88	4	88	596

(2) Includes estimated workforce requirements to operate projects when completed.

July 26, 1990

Table 4.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR PETROCHEMICAL PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker	47	73	58	51	23						252
Bricklayer		1									1
Carpenter	77	100	79	68	55	30	8				417
Cement Mason	16	3			6	23	6				54
Drilling Related Occs.											
Electrician	68	129	41	58	85	75	19				475
Insulator	18	50	16	22	56	26	7				195
Ironworker	72	60	44	25	17	25	6				249
Labourer	125	101	59	39	68	115	30				537
Millwright	23	23	4	13	23	20	5				111
Oper. Engineer/Teamster	62	89	41	34	25	20	5				276
Other	38	108	67	49	55	22	3				342
Pipefitter	205	251	40	70	119	217	55				957
Sheet Metal	4	4									8
Supervisory/Support	34	54	44	46	41	20	5				244
Welder	26	74	25	50	44	27	7				253
TOTAL WORK YEARS	815	1120	518	525	617	620	156				4371

Table 4.4

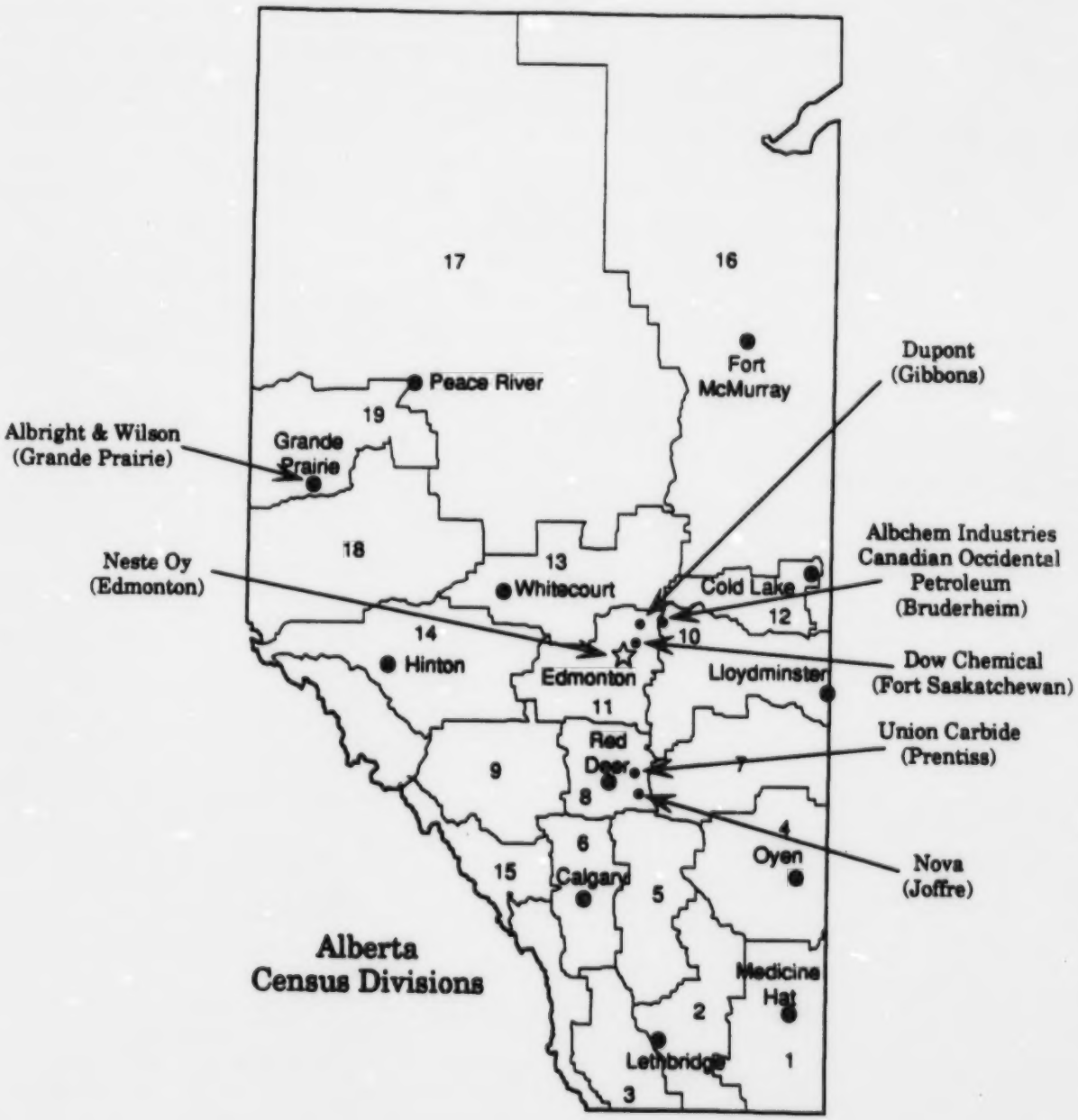
PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR PETROCHEMICAL PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.	3	4	4	15	15	15	22	22	22	22	22
Electrician	6	9	7	22	22	22	22	22	22	22	22
Engineer	12	16	14	67	67	67	71	71	71	71	
Instrumentation	7	11	11	22	22	22	25	25	25	25	25
Management	12	15	10	23	23	23	23	23	23	23	23
Millwright	4	8	8	17	17	17	18	18	18	18	18
Oilfield Occupations							5	5	5	5	5
Operating Engineer	4	6	6	9	9	9	14	14	14	14	14
Other		1		22	22	22	22	22	22	22	22
Other Trades		2	1	24	24	24	24	24	24	24	24
Pipefitter	7	10	9	20	20	20	23	23	23	23	23
Plant Operator	41	74	70	134	134	134	159	159	159	159	159
Support Staff	9	17	16	54	54	54	61	61	61	61	61
Technical	6	24	24	40	40	40	48	48	48	48	48
Welder	4	6	6	17	17	17	17	17	17	17	17
Woodland Occupations											
TOTAL ONGOING JOBS	115	203	186	486	486	486	554	554	554	554	554

July 30, 1990

Figure 4.1

Location of Major Petrochemicals Projects in Alberta



PART 5: MINING PROJECTS

FIGURE 5.0

ACTUAL AND PROJECTED TIMING OF NEW MAJOR MINING PROJECTS IN ALBERTA, 1990 - 1999 (1)

Project (Location)	Est. Cost ($M)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Carbovan Inc. (Phase 2) (Fort McMurray)	20			■							
Magnesium Co. (Phase 1) (High River)	110	◄									
Magnesium Co. (Phase 2) (High River)	140		■	■	■						
Magnesium Co. (Phase 3) (High River)	125					■	■	■			

■ Construction period ◄ Construction Started before 1990

Mining projects category includes mineral processing plants.

(1) Includes only actual and announced investment over $10 million.

TABLE 5.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR MINING PROJECTS IN ALBERTA, 1990 - 1999

Project (Phase) (Location)	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Carbovan Inc. (Phase 2) (Fort McMurray)	20	CONS			40							
		OPER			3	3	3	3	3	3	3	3
Magnesium Co. (Phase 1) (High River)	110	CONS	48									
		OPER	78	78	78	78	78	78	78	78	78	78
Magnesium Co. (Phase 2) (High River)	140	CONS		38	151	76						
		OPER			67	143	143	143	143	143	143	143
Magnesium Co. (Phase 3) (High River)	125	CONS					32	127	64			
		OPER						89	135	135	135	135
TOTAL MINING PROJECTS	395	CONS	48	38	191	76	32	127	64			
		OPER	78	78	148	224	224	313	359	359	359	359

CONS - Construction
OPER - Operation

July 26, 1990

TABLE 5.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC MINING PROJECTS IN ALBERTA, (1)

PROJECT PHASE	Carbovan Inc. Phase 2	Magnesium Co. Phase 1	Magnesium Co. Phase 2	Magnesium Co. Phase 3	Total Work Years
COST	20	110	140	125	
TRADE					
Boilermaker	3				3
Bricklayer					
Carpenter					
Cement Mason					
Drilling Related Occs.					
Electrician	12	18	27	22	79
Insulator	1				1
Ironworker	1	6	11	6	29
Labourer	7	11	16	13	47
Millwright	4	6	10	6	30
Oper. Engineer/Teamster		38	53	45	134
Other	1	41	63	94	199
Pipefitter	3	18	29	25	76
Sheet Metal	2				2
Supervisory/Support	2	18	27	22	69
Welder	4	19	29	25	77
TOTAL WORK YEARS	40	179	265	223	706

(1) Includes estimated workforce requirements to construct total project.

TABLE 5.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC MINING PROJECTS IN ALBERTA, (2)

PROJECT PHASE	Carbovan Inc. Phase 2	Magnesium Co. Phase 1	Magnesium Co. Phase 2	Magnesium Co. Phase 3	Total Ongoing Jobs
COST	20	110	140	125	
TRADE					
Acct./Purch.		1			1
Electrician		3	2	2	7
Engineer		2			2
Instrumentation		3	2	1	6
Management		16	8	8	34
Millwright		1			1
Oilfield Occupations					
Operating Engineer		4	4	2	10
Other		4		4	8
Other Trades		80	115	110	315
Pipefitter					
Plant Operator	3				3
Support Staff		6	8	4	18
Technical		7	6	1	14
Welder		2	4	2	8
Woodland Occupations					
TOTAL ONGOING JOBS	3	135	145	135	418

(2) Includes estimated workforce requirements to operate projects when completed.

July 26, 1990

TABLE 5.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR MINING PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker			3								3
Bricklayer											
Carpenter											
Cement Mason											
Drilling Related Occs.											
Electrician	6	4	27	8	3	13	6				67
Insulator			1								1
Ironworker	3	2	7	3	1	6	2				24
Labourer	4	2	16	5	2	7	4				40
Millwright	3	2	10	2	1	5	2				25
Oper. Engineer/Teamster	8	8	30	15	6	27	12				106
Other	7	8	37	19	8	30	16				125
Pipefitter	6	4	20	8	4	13	8				63
Sheet Metal			2								2
Supervisory/Support	5	4	17	8	3	13	6				56
Welder	6	4	21	8	4	13	8				64
TOTAL WORK YEARS	48	38	191	76	32	127	64				576

TABLE 5.4

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR MINING PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.											
Electrician	1	1	2	3	3	4	5	5	5	5	5
Engineer											
Instrumentation			1	2	2	2	3	3	3	3	3
Management	8	8	13	17	17	22	26	26	26	26	26
Millwright											
Oilfield Occupations											
Operating Engineer	1	1	3	5	5	6	7	7	7	7	7
Other	2	2	2	2	2	4	6	6	6	6	6
Other Trades	59	59	109	171	171	246	281	281	281	281	281
Pipefitter											
Plant Operator			3	3	3	3	3	3	3	3	3
Support Staff	3	3	6	8	8	11	12	12	12	12	12
Technical	3	3	6	8	8	8	9	9	9	9	9
Welder	1	1	3	5	5	7	7	7	7	7	7
Woodland Occupations											
TOTAL ONGOING JOBS	78	78	148	224	224	313	359	359	359	359	359

July 26, 1990

Figure 5.1

Location of Major Mining Projects in Alberta

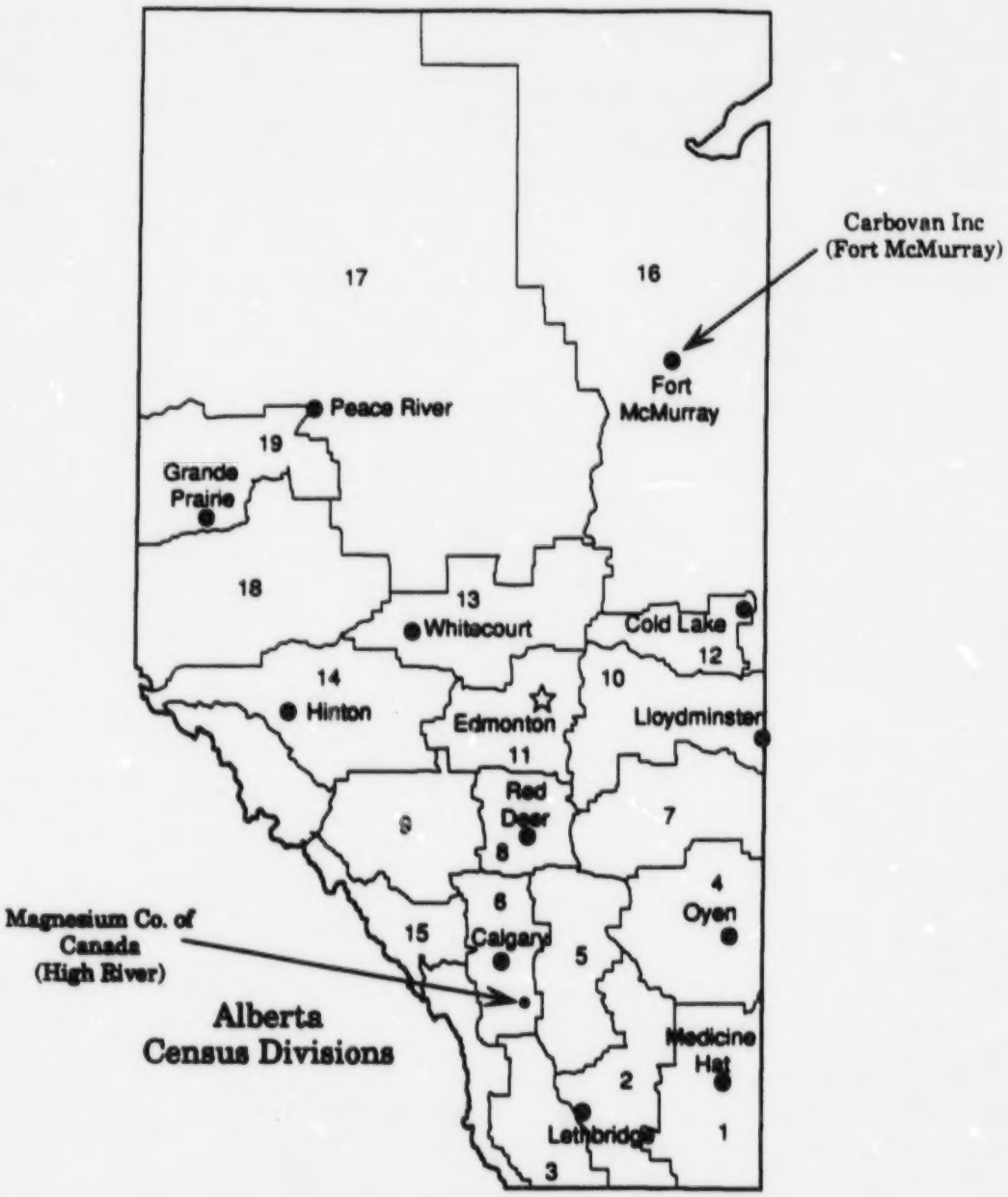


FIGURE 6.0
ACTUAL AND PROJECTED TIMING OF NEW MAJOR FORESTRY PROJECTS IN ALBERTA, 1990 - 1999 (1)

Project (Location)	Est. Cost ($M)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Alberta Energy Company (AEC) (Slave Lake)	140	←									
Alberta Newsprint (ANC) (Whitecourt)	379	←									
Alberta Newsprint (ANC) (Whitecourt)	50										
Alberta Pacific Pulp Mill (Athabasca)	1000										
Alberta Pacific Paper Mill (Athabasca)	300										
Consumers Paper Corp. (Redcliff)	30										
Daishowa (Peace River)	500	←									
Northem (Lac La Biche)	16										
Polyboard Manufacturing Co. (High Prairie)	70										
Procter and Gamble Upgrade (Grande Prairie)	50	←									
Procter and Gamble Pulp Mill (Grande Prairie)	315										
Procter and Gamble (Manning)	35										
Sundance (Edson)	20	←									
Sunpine (Rocky Mountain House)	32										
Weldwood (Hinton)	381	←									
Weldwood (Hinton)	30										
Y.F. Yu Paper Manufacturing Co. (High Prairie)	600										

■ Construction period ←■ Construction started before 1990 ■-■ Limited construction during period

(1) Includes only actual and announced investment over $10 million.

TABLE 6.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR FORESTRY PROJECTS IN ALBERTA, 1990 - 1999

Project (Phase) (Location)	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Alberta Energy Company (Slave Lake)	140	CONS	275									
		OPER	135	135	135	135	135	135	135	135	135	135
Alberta Newsprint (Whitecourt)	379	CONS	329									
		OPER	375	375	375	375	375	375	375	375	375	375
Alberta Newsprint (Whitecourt)	50	CONS			110							
		OPER			15	15	15	15	15	15	15	15
Alberta Pacific - Pulp Mill (Athabasca)	1000	CONS		925	1200	675						
		OPER			400	1100	1100	1100	1100	1100	1100	1100
Alberta Pacific - Paper Mill (Athabasca)	300	CONS				300	700	250				
		OPER						200	200	200	200	200
Consumers Paper Corp (Redcliff)	30	CONS	15	41								
		OPER		35	35	35	35	35	35	35	35	35
Daishowa (Peace River)	500	CONS	514									
		OPER	430	660	660	660	660	660	660	660	660	660
Northern (Lac La Biche)	16	CONS	48	12								
		OPER	115	140	140	140	140	140	140	140	140	140
Polyboard Manufacturing Co. (High Prairie)	70	CONS		52	111							
		OPER			155	295	295	295	295	295	295	295
Procter & Gamble Upgrade (Grande Prairie)	50	CONS										
		OPER										
Procter & Gamble Pulp Mill (Grande Prairie)	315	CONS				93	450	257				
		OPER					178	300	300	300	300	300
Procter & Gamble (Manning)	35	CONS					30	45				
		OPER					120	120	120	120	120	120
Sundance (Edson)	20	CONS	67									
		OPER	150	150	150	150	150	150	150	150	150	150
Sunpine (Rocky Mountain House)	32	CONS	38	62								
		OPER		200	200	200	200	200	200	200	200	200
Weldwood (Hinton)	361	CONS	70									
		OPER										
Weldwood (Hinton)	50	CONS			50	70						
		OPER				80	80	80	80	80	80	80
Y.F. Yu Paper Manu. Co. (High Prairie)	600	CONS		31	444	329						
		OPER			66	234	375	375	375	375	375	375
TOTAL FORESTRY PROJECTS	3948	CONS	1356	1123	1915	1467	1180	552				
		OPER	1205	1695	2331	3419	3858	4180	4180	4180	4180	4180

CONS - Construction
OPER - Operation

July 26, 1990

TABLE 6.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC
FORESTRY PROJECTS IN ALBERTA, (1)

PROJECT	Alberta Energy Company	Alberta Hosepipe	Alberta Hosepipe	Alberta Pacific - Pulp Mill	Alberta Pacific - Paper Mill	Consumers Paper Corp	Dashwood	Northern	Polyboard Manufacturing Co	Procter & Gamble Upgrade	Procter & Gamble Pulp Mill	Procter & Gamble	Sundance	Sunpine	Weldwood	Weldwood	Y F Yu Paper Manu Co	Total Work Years
COST	148	376	82	1696	368	36	680	16	76	58	315	36	26	32	361	56	660	
TRADE																		
Administrator																		
Bricklayer																		
Carpenter																		
Cement Mason																		
Drilling Related Occs.																		
Electrician																		
Heat/Air																		
Insulator																		
Labourer																		
Millwright																		
Oper. Engineer/Teamster																		
Other																		
Pipefitter																		
Sheet Metal																		
Supervisory/Support																		
Welder																		
TOTAL WORK YEARS																		

(1) Includes estimated workforce requirements to construct total project.

TABLE 6.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC
FORESTRY PROJECTS IN ALBERTA, (2)

PROJECT	Alberta Energy Company	Alberta Hosepipe	Alberta Hosepipe	Alberta Pacific - Pulp Mill	Alberta Pacific - Paper Mill	Consumers Paper Corp	Dashwood	Northern	Polyboard Manufacturing Co	Procter & Gamble Upgrade	Procter & Gamble Pulp Mill	Procter & Gamble	Sundance	Sunpine	Weldwood	Weldwood	Y F Yu Paper Manu Co	Total Ongoing Jobs
COST	148	376	82	1696	368	36	680	16	76	58	315	36	26	32	361	56	660	
TRADE																		
Asst./Fores.																		
Electrician																		
Engineer																		
Instrumentation																		
Management																		
Millwright																		
Office/Computation																		
Operating Engineer																		
Other																		
Other Trades																		
Pipefitter																		
Plant Operator																		
Support Staff																		
Technical																		
Welder																		
Woodland Occupations																		
TOTAL ONGOING JOBS																		

(2) Includes estimated workforce requirements to operate projects when completed.

July 22, 1988

TABLE 6.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR FORESTRY PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker	4	7	15	10	7	4					47
Bricklayer	4	4	17	14	10	5					54
Carpenter	99	154	241	201	184	73					952
Cement Mason	15	17	28	15	14	7					96
Drilling Related Occs.											
Electrician	182	94	166	129	116	55					742
Insulator	19	59	107	89	64	22					360
Ironworker	73	56	120	104	96	39					488
Labourer	250	240	377	275	212	112					1466
Millwright	109	80	141	108	88	46					572
Oper. Engineer/Teamster	55	68	88	57	29	14					311
Other	115	110	175	133	71	19					623
Pipefitter	228	123	271	202	182	98					1104
Sheet Metal	53	23	58	50	42	30					256
Supervisory/Support	135	60	90	66	57	25					433
Welder	15	28	21	14	8	3					89
TOTAL WORK YEARS	1356	1123	1915	1467	1180	552					7593

TABLE 6.4

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR FORESTRY PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.	17	19	24	37	42	50	50	50	50	50	50
Electrician	24	31	45	55	72	82	82	82	82	82	82
Engineer	19	22	38	52	57	65	65	65	65	65	
Instrumentation	35	38	46	55	75	88	88	88	88	88	88
Management	92	112	143	197	205	234	234	234	234	234	234
Millwright	63	75	97	128	147	165	165	165	165	165	165
Oilfield Occupations											
Operating Engineer	20	22	29	56	62	66	66	66	66	66	66
Other	61	77	88	178	186	194	194	194	194	194	194
Other Trades	70	103	148	179	199	221	221	221	221	221	221
Pipefitter	22	22	27	36	36	40	40	40	40	40	40
Plant Operator	306	403	535	710	774	872	872	872	872	872	872
Support Staff	44	53	82	113	120	127	127	127	127	127	127
Technical	39	48	81	92	102	121	121	121	121	121	121
Welder	12	16	23	28	44	51	51	51	51	51	51
Woodland Occupations	381	654	925	1503	1737	1804	1804	1804	1804	1804	1804
TOTAL ONGOING JOBS	1205	1695	2331	3419	3858	4180	4180	4180	4180	4180	4180

July 26, 1990

Figure 6.1

Location of Major Forest Projects in Alberta Under Construction

PART 7: PIPELINE PROJECTS

FIGURE 7.0

ACTUAL AND PROJECTED TIMING OF NEW MAJOR PIPELINE PROJECTS IN ALBERTA, 1990 - 1999 (1)

Project (Location)	Est. Cost ($M)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Amoco/Foothills Pipeline	30	■									
Cold Lake Pipeline	80						■	■			
Gulf (Edson Area)	28	←■									
Nova	3000	←■	■	■	■	■					
Trans Mountain	400							■			

■ Construction period ←■ Construction started before 1990

(1) Includes only actual and announced investment over $10 million.

TABLE 7.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR PIPELINE PROJECTS IN ALBERTA, 1990 - 1999

Project (Phase) (Location)	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Amoco/Foothills Pipeline	30	CONS	69									
		OPER										
Cold Lake Pipeline	80	CONS						55	120			
		OPER							1	1	1	1
Gulf (Edson Area)	28	CONS	57									
		OPER	6	6	6	6	6	6	6	6	6	6
Nova	3000	CONS	1590	1590	1230	1200	1080					
		OPER	444	508	560	593	612	612	612	612	612	612
Trans Mountain	400	CONS						325	500			
		OPER							10			
TOTAL PIPELINE PROJECTS	3538	CONS	1716	1590	1230	1200	1080	380	620			
		OPER	450	514	566	599	618	618	629	619	619	619

CONS - Construction
OPER - Operation

July 26, 1990

TABLE 7.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC PIPELINE PROJECTS IN ALBERTA. (1)

PROJECT	Amoco/Foothills Pipeline	Cold Lake Pipeline	Gulf	Nova	Trans Mountain	Total Work Years
COST	30	80	28	3000	400	
TRADE						
Boilermaker	1			26	4	31
Bricklayer						
Carpenter	4				41	45
Cement Mason	1			80	8	89
Drilling Related Occs.					50	50
Electrician	15	33	3	692		743
Insulator		4		201	17	222
Ironworker	7	4		240	17	268
Labourer	6	31	11	1374	186	1608
Millwright	2	4		135	8	149
Oper. Engineer/Teamster	4	52	24	2325	273	2678
Other		7	2	1161	33	1203
Pipefitter	28	4		791	31	854
Sheet Metal						
Supervisory/Support	1	16	6	640	58	721
Welder		20	18	760	99	897
TOTAL WORK YEARS	69	175	64	8425	825	9558

(1) Includes estimated workforce requirements to construct total project.

TABLE 7.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC PIPELINE PROJECTS IN ALBERTA. (2)

PROJECT	Amoco/Foothills Pipeline	Cold Lake Pipeline	Gulf	Nova	Trans Mountain	Total Ongoing Jobs
COST	30	80	28	3000	400	
TRADE						
Acct./Purch.				32	1	33
Electrician						
Engineer				105	2	107
Instrumentation						
Management				19	1	20
Millwright						
Oilfield Occupations						
Operating Engineer						
Other				13		13
Other Trades		1	2	124	2	129
Pipefitter						
Plant Operator	1		4			5
Support Staff				109		109
Technical				206	2	210
Welder				2	2	4
Woodland Occupations						
TOTAL ONGOING JOBS	1	1	6	612	10	630

(2) Includes estimated workforce requirements to operate projects when completed.

July 26, 1990

TABLE 7.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR PIPELINE PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker	1					1	3				5
Bricklayer											
Carpenter	8	4	5	1	1	16	25				60
Cement Mason	1		12	12	12	3	5				45
Drilling Related Occs.											
Electrician	146	128	94	94	94	29	54				639
Insulator	40	40	29	29	29	8	13				188
Ironworker	55	48	35	35	35	9	12				229
Labourer	288	274	203	203	173	85	132				1358
Millwright	26	24	17	17	17	5	7				113
Oper. Engineer/Teamster	426	402	296	296	240	123	202				1985
Other	204	202	201	175	150	15	25				972
Pipefitter	176	148	109	109	100	13	22				677
Sheet Metal											
Supervisory/Support	127	120	82	82	82	28	46				567
Welder	218	200	147	147	147	45	74				978
TOTAL WORK YEARS	1716	1590	1230	1200	1080	380	620				7816

TABLE 7.4

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR PIPELINE PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.	26	27	32	32	32	32	33	32	32	32	32
Electrician											
Engineer	74	86	92	97	105	105	107	105	105	105	105
Instrumentation											
Management	13	15	16	18	19	19	20	19	19	19	19
Millwright											
Oilfield Occupations											
Operating Engineer											
Other		3	6	10	13	13	13	13	13	13	13
Other Trades	73	93	114	124	126	126	129	127	127	127	127
Pipefitter											
Plant Operator	4	4	4	4	4	4	4	4	4	4	4
Support Staff	103	106	107	109	109	109	111	109	109	109	109
Technical	157	180	193	203	208	208	210	208	208	208	208
Welder			2	2	2	2	2	2	2	2	2
Woodland Occupations											
TOTAL ONGOING JOBS	450	514	566	599	618	618	629	619	619	619	619

July 26, 1990

PART 8: ELECTRIC UTILITY/DAM PROJECTS

FIGURE 8.0

ACTUAL AND PROJECTED TIMING OF NEW MAJOR ELECTRIC UTILITY/DAM PROJECTS IN ALBERTA, 1990 - 1999 (1)

Project (Location)	Est. Cost ($M)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Blood Indian Irrigation Project (Lethbridge)	65	▬	▬	▬	▬	▬	▬	▬	▬	▬	
Genesee I (Genesee)	630	◂▬	▬	▬	▬						
Little Bow Dam (Nanton Area)	27			▬	▬						
Oldman Dam (Pincher Creek)	360	◂▬									
Sheerness II (Sheerness)	370	◂▬									
Pine Coulee Dam (Granum Area)	35			▬	▬	▬					

▬ Construction period. ◂▬ Construction started before 1990

▬ Limited construction during period.

(1) Includes only actual and announced investment over $10 million.

TABLE 8.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR ELECTRIC UTILITIES & DAMS PROJECTS IN ALBERTA, 1990 - 1999

Project (Phase) (Location)	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Blood Indian Irrigation Proj. (Lethbridge)	85	CONS	14	48	49	67	45	20	14	9		
		OPER						2	2	2	2	2
Genesee I (Genesee)	650	CONS	204	31	335	83						
		OPER										
Little Bow Dam (Nanton Area)	27	CONS			108	94						
		OPER										
Oldman Dam (Pincher Creek)	360	CONS	70									
		OPER	3	5	5	5	5	5	5	5	5	5
Sheerness II (Sheerness)	370	CONS	80									
		OPER										
Pine Coulee Dam (Granum Area)	35	CONS			100	100	50					
		OPER										
TOTAL ELECTRIC UTILITIES & DAMS PROJECTS	1507	CONS	368	77	590	324	95	20	14	9		
		OPER	3	5	5	5	5	7	7	7	7	7

CONS - Construction
OPER - Operation

August 29, 1990

TABLE 8.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC ELECTRIC UTILITIES & DAMS PROJECTS IN ALBERTA, (1)

PROJECT	Blood Indian Irrigation Proj.	Genesee I	Little Bow Dam	Oldman Dam	Sheerness II	Pine Coulee Dam	Total Work Years
COST	65	650	27	360	370	35	
TRADE							
Boilermaker		145			94		239
Bricklayer							
Carpenter	11	88	7	38	14	11	169
Cement Mason	10	20	6	47	1	10	94
Drilling Related Occs.							
Electrician		156		20	101		277
Insulator		40			27		67
Ironworker		80			9		89
Labourer	79	138	68	145	42	80	552
Millwright		35			44		79
Oper. Engineer/Teamster	79	90	68	347	41	75	700
Other	24	128	14	239	88	28	521
Pipefitter		155			77		232
Sheet Metal		75			29		104
Supervisory/Support	53	290	32	54	18	40	487
Welder	8	40	5		9	6	68
TOTAL WORK YEARS	264	1460	200	890	594	250	3678

(1) Includes estimated workforce requirements to construct total project.

TABLE 8.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC ELECTRIC UTILITIES & DAMS PROJECTS IN ALBERTA, (2)

PROJECT	Blood Indian Irrigation Proj.	Genesee I	Little Bow Dam	Oldman Dam	Sheerness II	Pine Coulee Dam	Total Ongoing Jobs
COST	65	650	27	360	370	35	
TRADE							
Acct./Purch.							
Electrician		6			4		10
Engineer		5		1			6
Instrumentation		5					5
Management					1		1
Millwright		6			10		16
Oilfield Occupations							
Operating Engineer	2	1		4			7
Other		6					6
Other Trades					2		2
Pipefitter		1			10		11
Plant Operator		5					5
Support Staff		2					2
Technical		2			1		3
Welder		1					1
Woodland Occupations							
TOTAL ONGOING JOBS	2	40		5	28		75

(2) Includes estimated workforce requirements to operate projects when completed.

August 29, 1990

TABLE 8.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR ELECTRIC UTILITIES & DAMS PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker	103		10	1							114
Bricklayer											
Carpenter	15	4	36	13	4	1	1				74
Cement Mason	3	2	8	9	6	1	1				30
Drilling Related Occs.											
Electrician	14	2	50	7							73
Insulator	12		20	2							34
Ironworker	9		5	1							15
Labourer	33	17	104	86	28	6	4	4			282
Millwright	13		20	1							34
Oper. Engineer/Teamster	50	17	92	84	27	6	4	2			282
Other	47	13	41	35	8	2	1	1			148
Pipefitter	23	2	60	5							90
Sheet Metal	6		17	2							25
Supervisory/Support	37	19	116	70	19	4	3	1			269
Welder	3	1	11	8	3			1			27
TOTAL WORK YEARS	368	77	590	324	95	20	14	9			1497

TABLE 8.4

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR ELECTRIC UTILITIES & DAMS PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.											
Electrician											
Engineer	1	1	1	1	1	1	1	1	1	1	1
Instrumentation											
Management											
Millwright											
Oilfield Occupations											
Operating Engineer	2	4	4	4	4	4	4	4	4	4	4
Other						2	2	2	2	2	2
Other Trades											
Pipefitter											
Plant Operator											
Support Staff											
Technical											
Welder											
Woodland Occupations											
TOTAL ONGOING JOBS	3	5	5	5	5	7	7	7	7	7	7

July 26, 1990

Figure 8.1

Location of Major Electric Utility/Dam Projects in Alberta

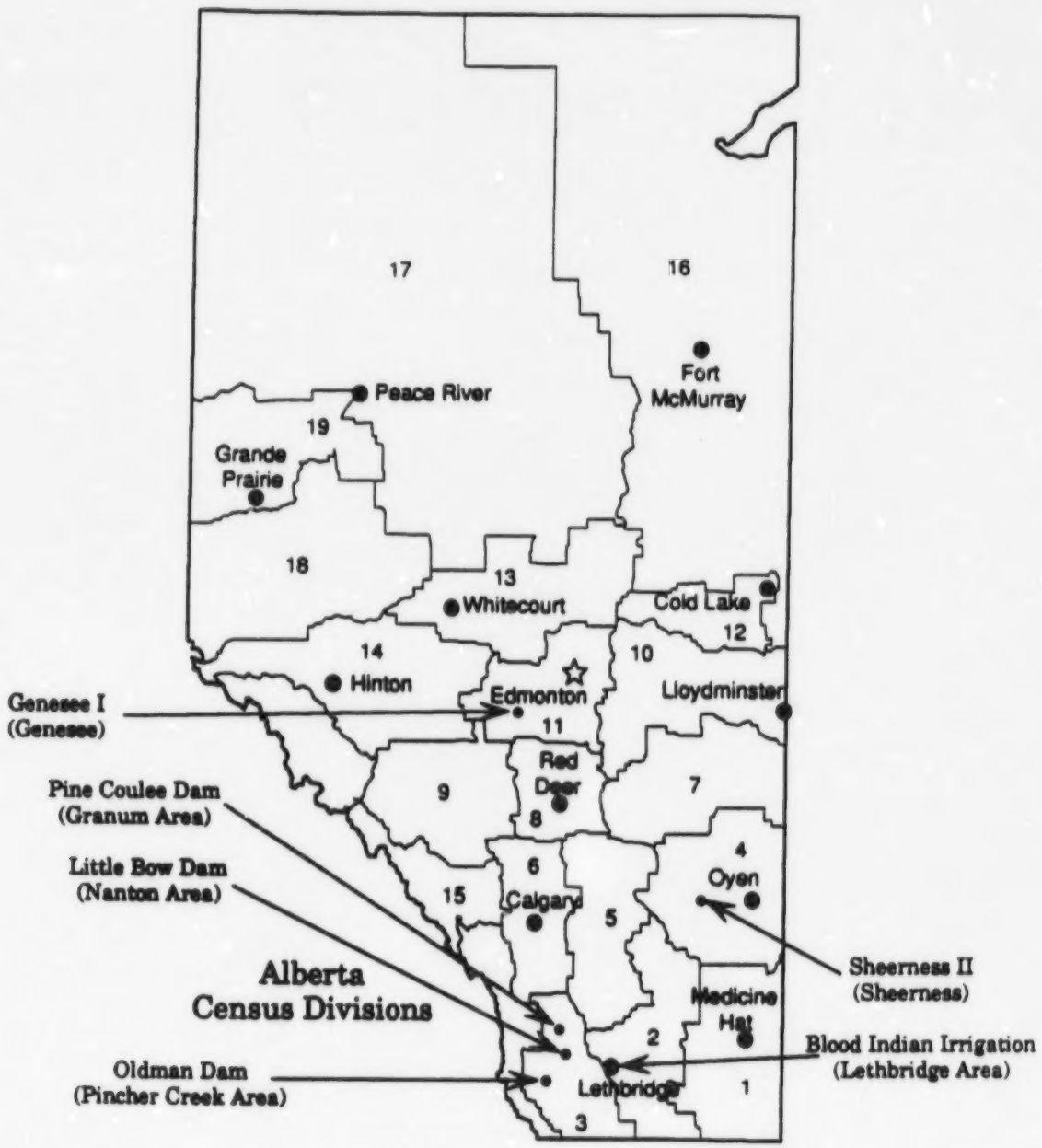
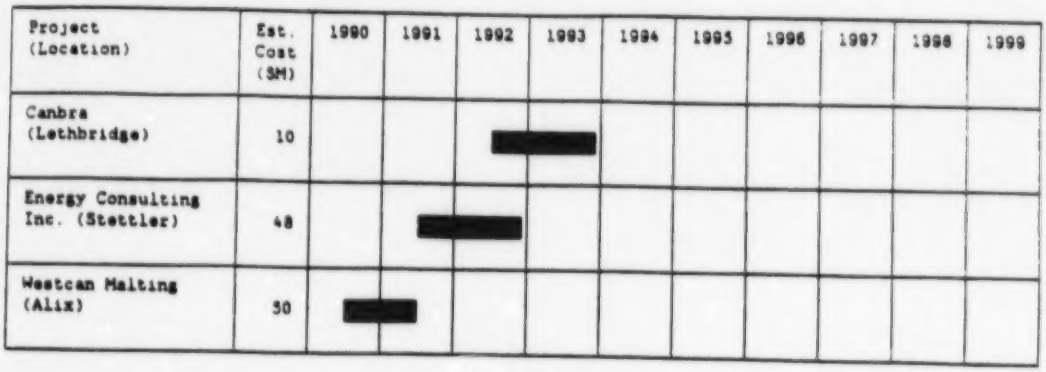


FIGURE 9.0

ACTUAL AND PROJECTED TIMING OF NEW MAJOR AGRICULTURAL PROJECTS IN ALBERTA, 1990 - 1999 (1)



(1) Includes only actual and announced investment over $10 million.

TABLE 9.0

PROJECTED CONSTRUCTION AND OPERATIONAL WORKFORCE REQUIREMENTS FOR NEW MAJOR AGRICULTURAL PROJECTS IN ALBERTA, 1990 - 1999

Project (Phase) (Location)	Est. Cost ($M)		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Canbra (Lethbridge)	10	CONS			15	5						
		OPER				3	3	3	3	3	3	3
Energy Consulting Inc. (Stettler)	48	CONS		48	52							
		OPER			18	110	110	110	110	110	110	110
Westcan Malting (Alix)	50	CONS	23	74								
		OPER			25	25	25	25	25	25	25	25
TOTAL AGRICULTURAL PROJECTS	58	CONS	23	122	67	5						
		OPER			43	138	138	138	138	138	138	138

CONS - Construction
OPER - Operation

July 26, 1990

TABLE 9.1

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS FOR SPECIFIC AGRICULTURAL PROJECTS IN ALBERTA, (1)

PROJECT	Canbra	Energy Consulting Inc.	Westcan Malting	Total Work Years
COST	10	48	50	
TRADE				
Boilermaker			3	3
Bricklayer	1	2	1	4
Carpenter		4	8	12
Cement Mason		6	3	9
Drilling Related Occs.				
Electrician	4	11	15	30
Insulator	1	6	3	10
Ironworker	1	12	6	19
Labourer	3	20	17	40
Millwright	3	4	10	17
Oper. Engineer/Teamster		3	6	9
Other		8	6	14
Pipefitter	3	7	8	18
Sheet Metal	2	3	3	8
Supervisory/Support	2	9	6	17
Welder		5	2	7
TOTAL WORK YEARS	20	100	97	217

(1) Includes estimated workforce requirements to construct total project.

TABLE 9.2

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS FOR SPECIFIC AGRICULTURAL PROJECTS IN ALBERTA, (2)

PROJECT	Canbra	Energy Consulting Inc.	Westcan Malting	Total Ongoing Jobs
COST	10	48	50	
TRADE				
Acct./Purch.		1	1	2
Electrician		1		1
Engineer				
Instrumentation		1		1
Management		5	2	7
Millwright		1		1
Oilfield Occupations				
Operating Engineer		9		9
Other		75		75
Other Trades		12		12
Pipefitter				
Plant Operator	3		20	23
Support Staff		4	1	5
Technical		1	1	2
Welder				
Woodland Occupations				
TOTAL ONGOING JOBS	3	110	25	138

(2) Includes estimated workforce requirements to operate projects when completed.

July 26, 1990

TABLE 9.3

PROJECTED CONSTRUCTION WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR AGRICULTURAL PROJECTS IN ALBERTA, 1990 - 1999

Year/Trade	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Work Years
Boilermaker		3									3
Bricklayer		2	2								4
Carpenter	3	7	2								12
Cement Mason	1	5	3								9
Drilling Related Occs.											
Electrician	3	17	9	1							30
Insulator		6	4								10
Ironworker	2	10	7								19
Labourer	6	21	12	1							40
Millwright		12	4	1							17
Oper. Engineer/Teamster	2	6	1								9
Other	2	7	5								14
Pipefitter	2	9	7								18
Sheet Metal		4	3	1							8
Supervisory/Support	2	9	5	1							17
Welder		4	3								7
TOTAL WORK YEARS	23	122	67	5							217

TABLE 9.4

PROJECTED OPERATIONAL WORKFORCE REQUIREMENTS BY YEAR FOR NEW MAJOR AGRICULTURAL PROJECTS IN ALBERTA, 1990 - 1999

Year/ Trade/Occupation	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Ongoing Jobs
Acct./Purch.			1	2	2	2	2	2	2	2	2
Electrician			1	1	1	1	1	1	1	1	1
Engineer											
Instrumentation			1	1	1	1	1	1	1	1	1
Management			5	7	7	7	7	7	7	7	7
Millwright				1	1	1	1	1	1	1	1
Oilfield Occupations											
Operating Engineer			2	9	9	9	9	9	9	9	9
Other			10	75	75	75	75	75	75	75	75
Other Trades				12	12	12	12	12	12	12	12
Pipefitter											
Plant Operator			20	23	23	23	23	23	23	23	23
Support Staff			2	5	5	5	5	5	5	5	5
Technical			1	2	2	2	2	2	2	2	2
Welder											
Woodland Occupations											
TOTAL ONGOING JOBS			43	138	138	138	138	138	138	138	138

July 26, 1990

Figure 9.1

Location of Major Agricultural Projects in Alberta